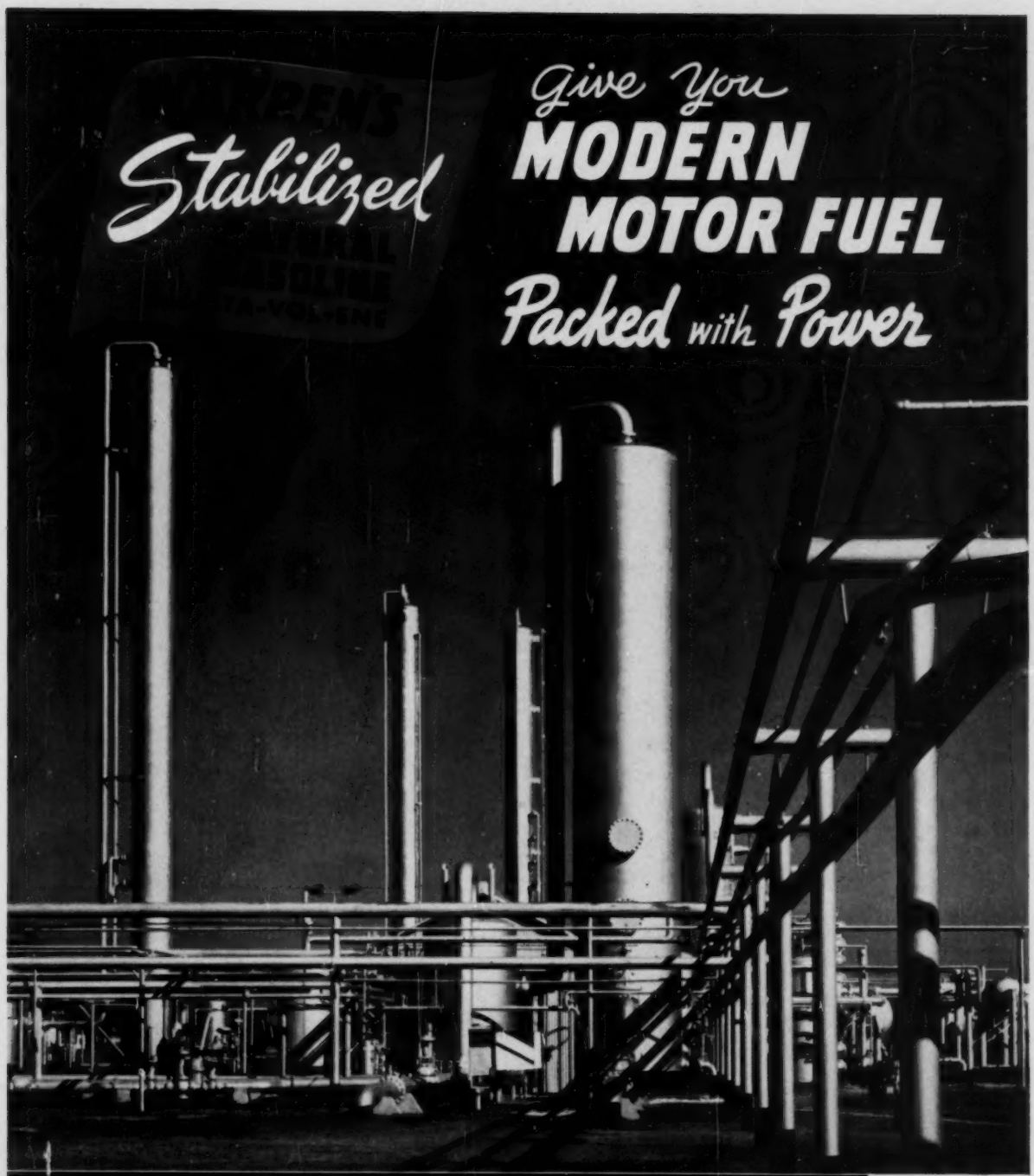
January 1952

World petroleum

FIVE DOLLARS PER YEAR • ONE DOLLAR PER COPY



WARREN PETROLEUM CORPORATION

Producers, Manufacturers, Exporters and Marketers

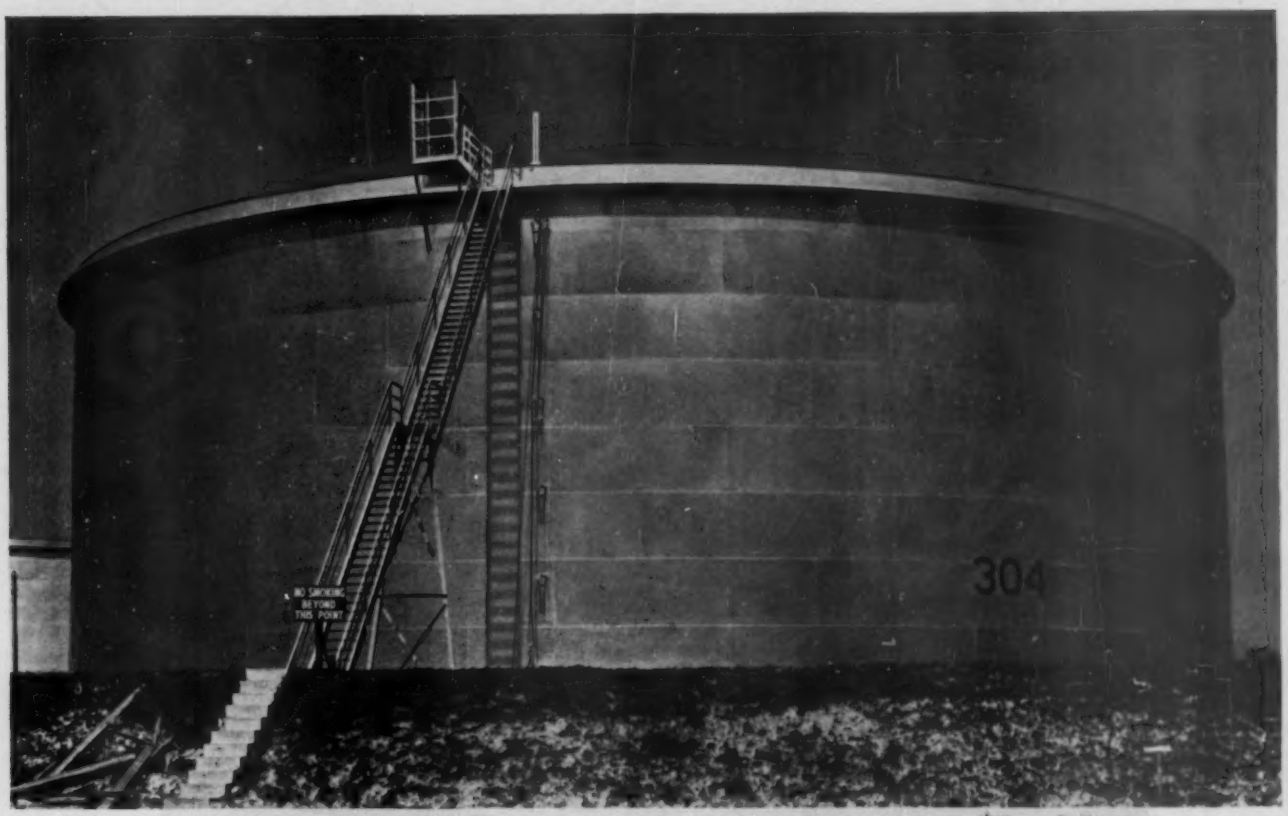
Export Terminals: Corpus Christi, Port Arthur, Baytown, Texas City, and Norsworthy, Houston, Texas.

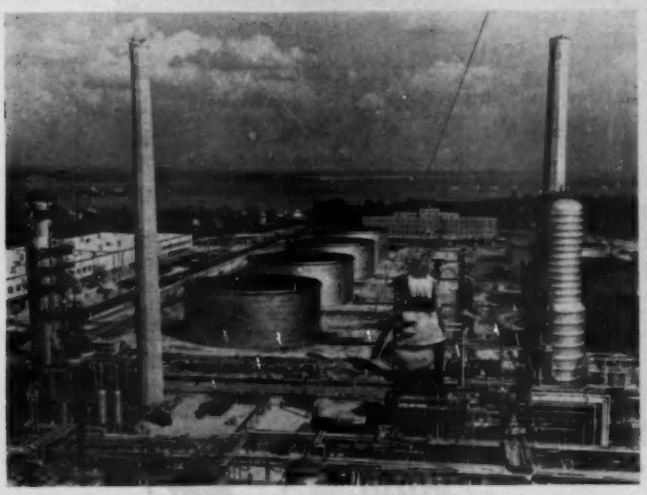
TULSA 2, OKLAHOMA CABLE ADDRESSES: Stavolene, Warren

30 YEARS' SERVICE

Crude Oil, Natural Gasoline and Liquefied Petroleum Products

Great Britain's *"Ace in the Hole"*





The view above illustrates a portion of the giant Esso Petroleum Company refinery at Fawley. Two years ago the first tree fell on the site, now the area is a forest of furnaces, towers, storage tanks, piers, workshops, and living quarters for personnel.

Horton Tanks Serve Giant Refinery at Fawley

Faced with the loss of Abadan, the world's largest oil refinery, Great Britain still has this *ace in the hole* at Fawley, England. It's the Esso Petroleum Company's giant 100-million dollar refinery which went on stream in September, 1951. In its first year, Fawley is expected to produce 5.5 million tons of gasoline, bunker fuel, jet fuel, naphtha, asphalt, lubricating oils, and kerosene. That's more than twice the amount of refined products imported from Iran.

Playing an important part in the successful operation of this huge refinery are thirteen 140 by 34-ft. tanks equipped with Horton Floating Roofs. They were built in England by Whessoe Limited, a Chicago Bridge and Iron licensee.

Horton Floating Roofs ride directly on the liquids stored in tanks. By eliminating the air vapor space, they eliminate breathing and filling losses, cut down on corrosion and reduce the danger of fire in the storage area.

For more information on Horton Floating Roofs or any other Horton structure, write our nearest office.

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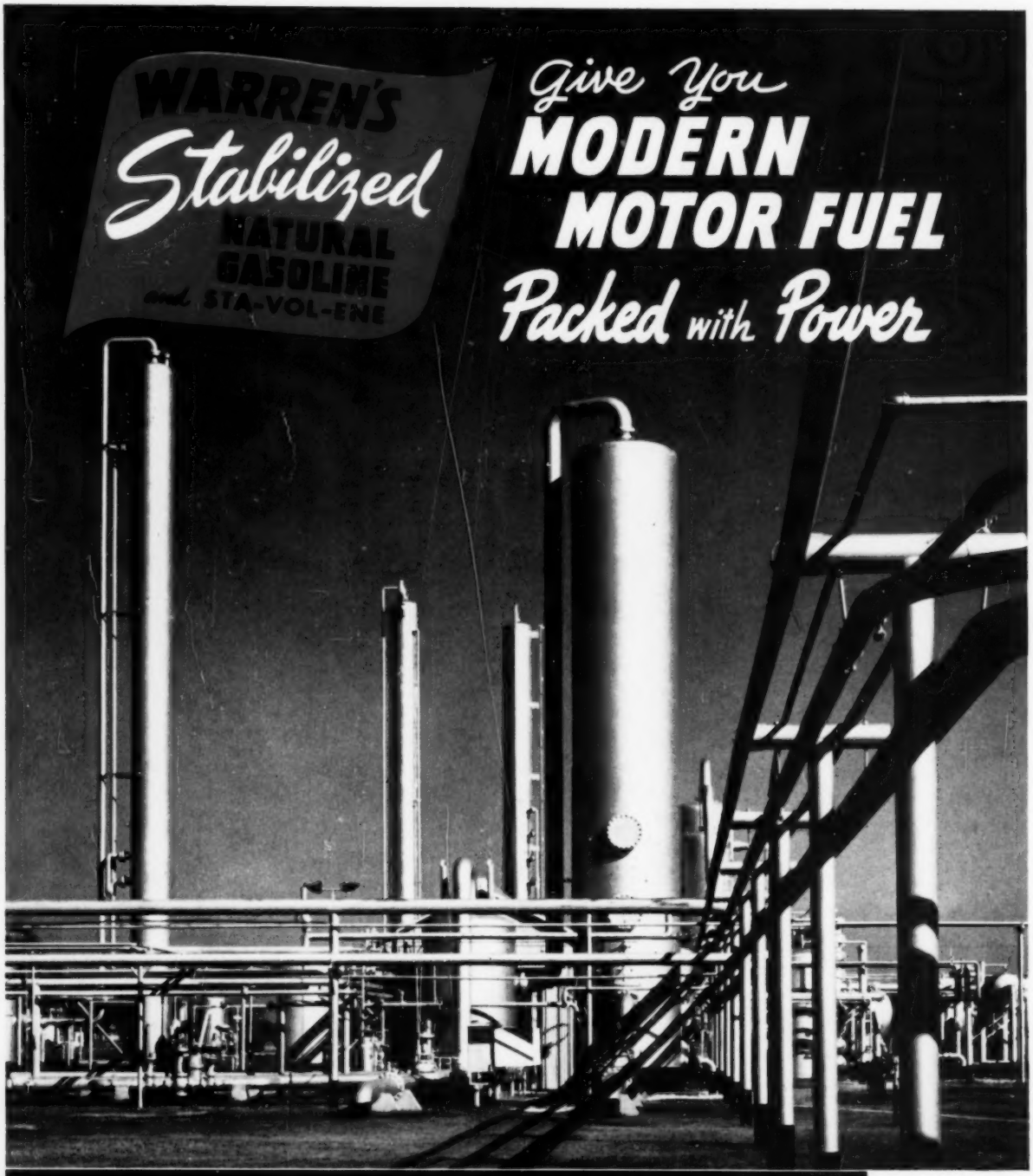
Horton Steel Works, Limited, Fort Erie, Ontario, Canada
W. P. Bryant, Edificio Abreu 402, Havana, Cuba
Sociedade Chibridge de Construcoes Ltda., Av. Franklin Roosevelt, 194-S/704 C, Rio de Janeiro, Brazil



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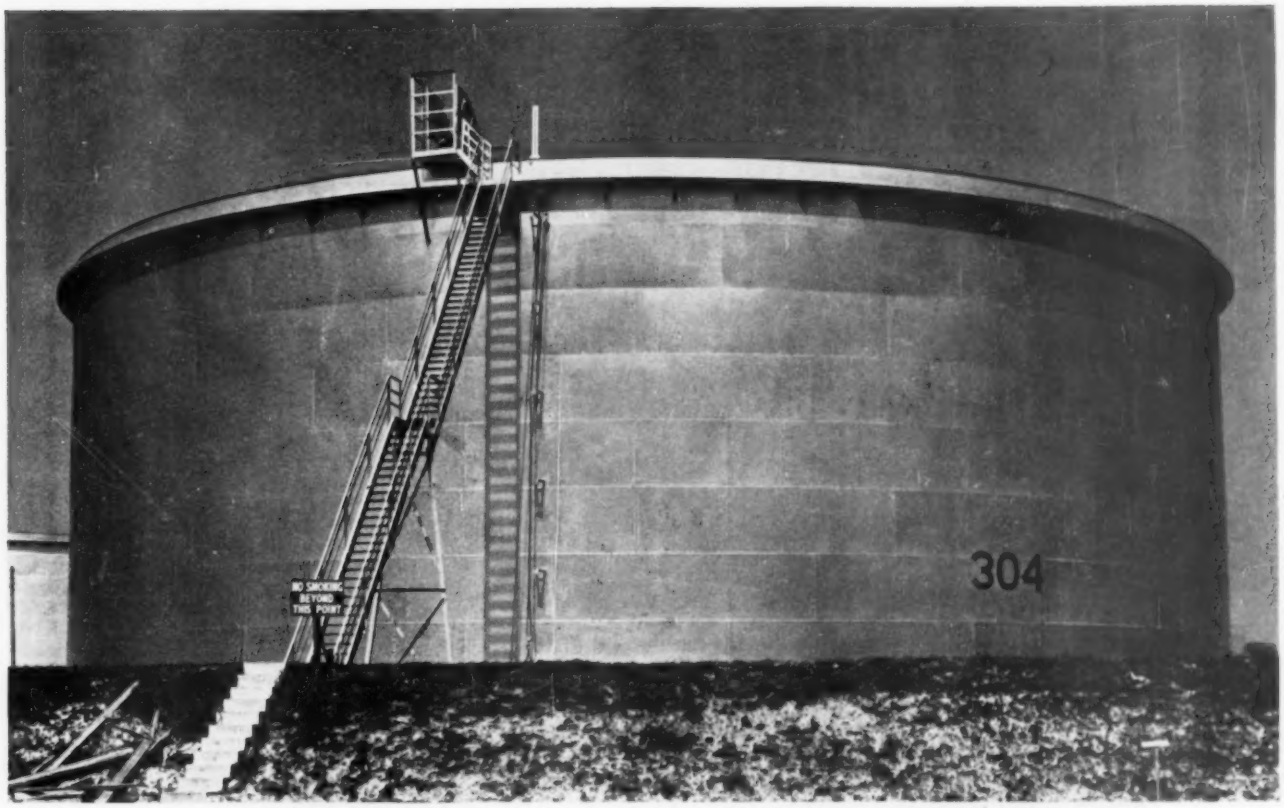

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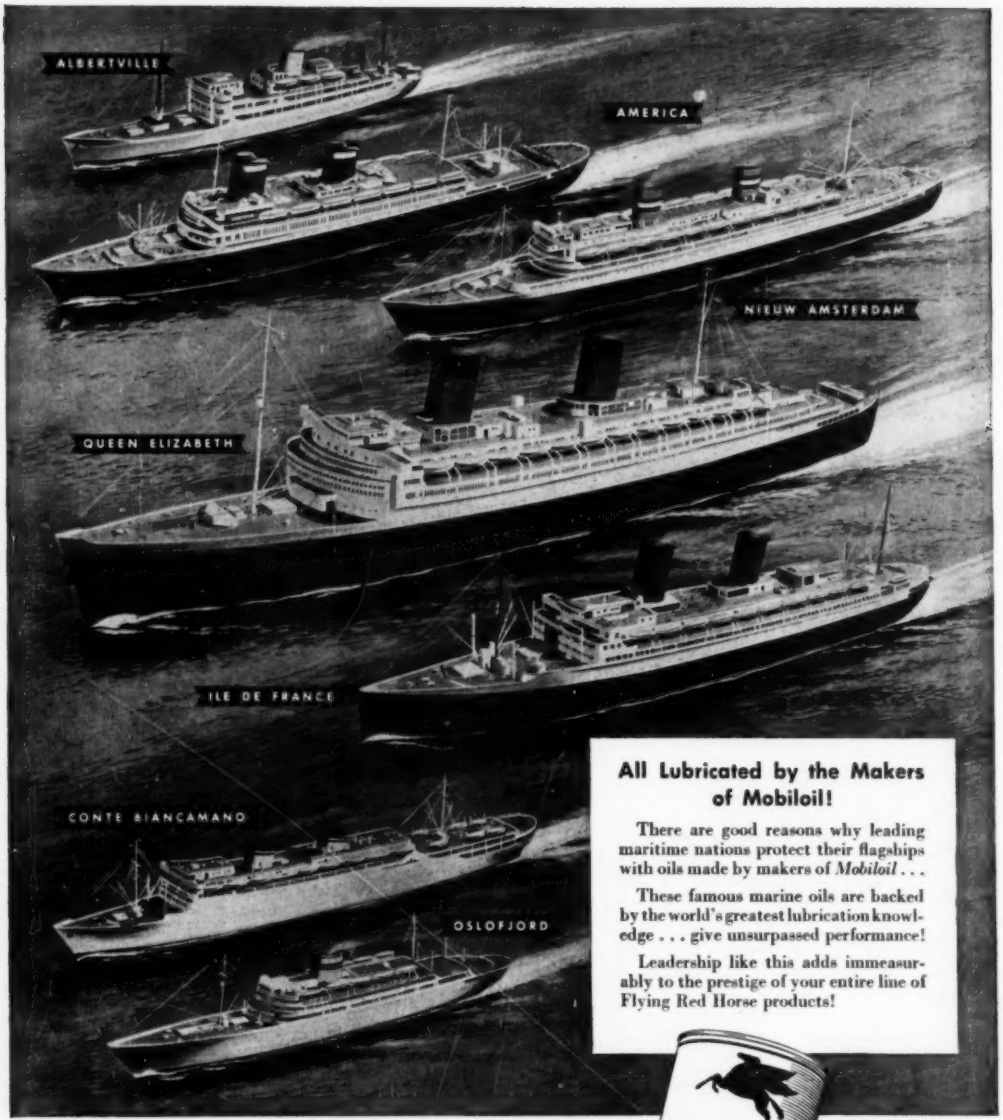
First With the Flagships



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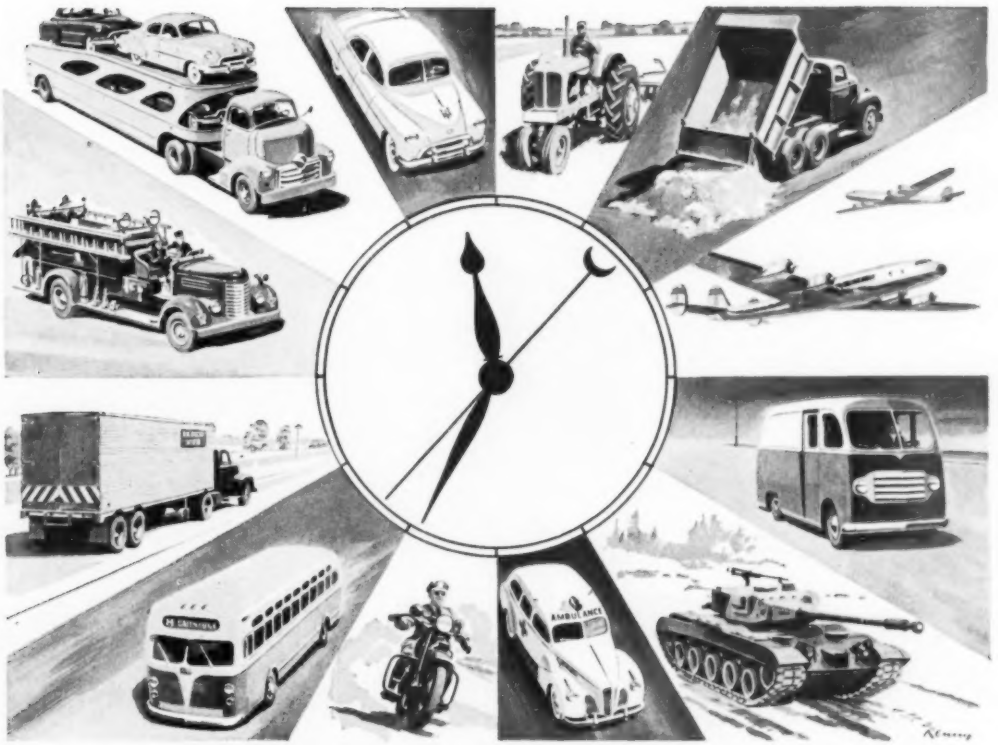

ANTIKNOCK COMPOUND

Every minute of every day this vital ingredient of gasoline helps millions of gasoline engines do more work . . . and do it more economically

The power that America gets from its millions of gasoline engines is more important than ever. Today 70% of passenger-car mileage is essential. 75% of the nation's freight—much of it defense material—is moved by truck. Buses carry 25,000,000 passengers daily. Most all of the engines that power these vehicles run on gasoline. And, of course, it is gasoline that keeps our air transport flying and most of our military equipment rolling.

These engines are able to do more work, do it faster and more economically, because the gasoline they use contains a few drops of antiknock compound. Right now about 98% of the gasoline produced by U. S. refiners contains antiknock fluid to boost its octane number.

Higher octane gasoline makes possible higher compression engines—which provide higher performance and develop more work from every gallon of fuel. Without high octane gasoline these engines would knock or "ping" —lose power, overheat, and run up big repair bills.

So, you see, there isn't a moment of the day when antiknock compound isn't doing a job somewhere for our country. A product you never see is tremendously important, both in our daily lives and in helping to meet the demands of the defense program.

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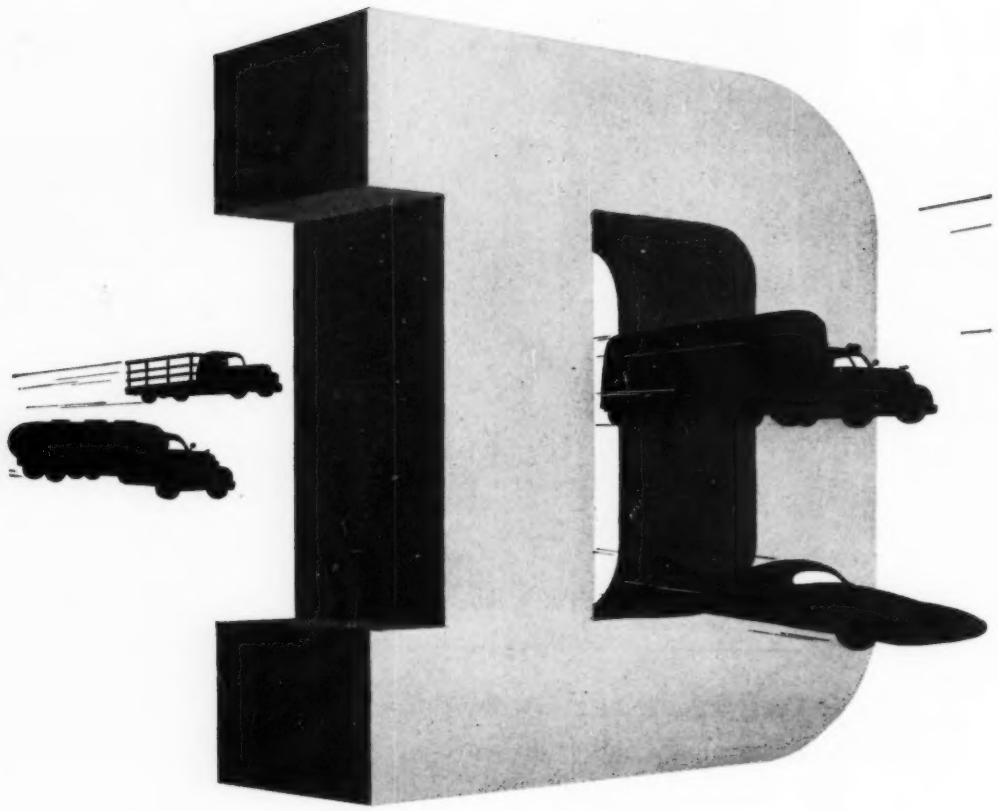
Manufacturers of "ETHYL" antiknock fluid



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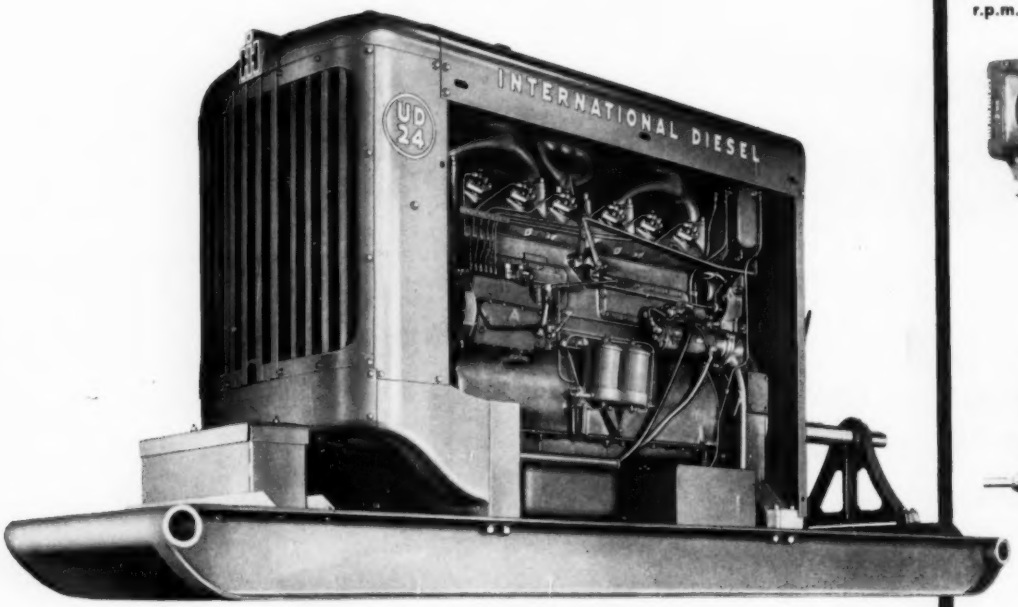
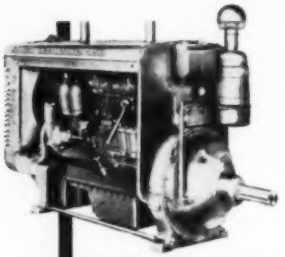
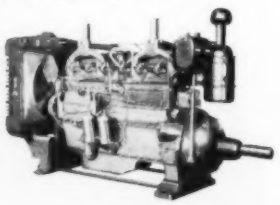


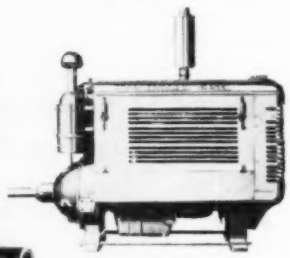
UD-24, 180 h.p. at 1,375 r.p.m. 6-cylinder Diesel



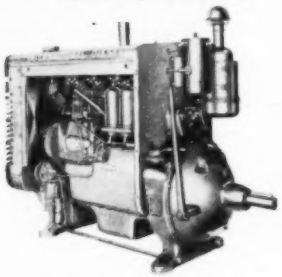
UD-18A, 125 h.p. at 1,600 r.p.m. 6-cylinder Diesel



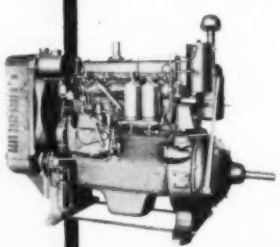
UD-16, 100 h.p. at 1,800 r.p.m. 6-cylinder Diesel



UD-14A, 76 h.p. at 1,400 r.p.m. 4-cylinder Diesel



UD-9A, 62.5 h.p. at 1,500 r.p.m. 4-cylinder Diesel



UD-6A, 45 h.p. at 1,600 r.p.m. 4-cylinder Diesel

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To you, the International Industrial Power Distributor represents these advantages. He specializes in application and service of this equipment . . . can give you expert guidance in selection of the right power unit for *your* particular requirements.

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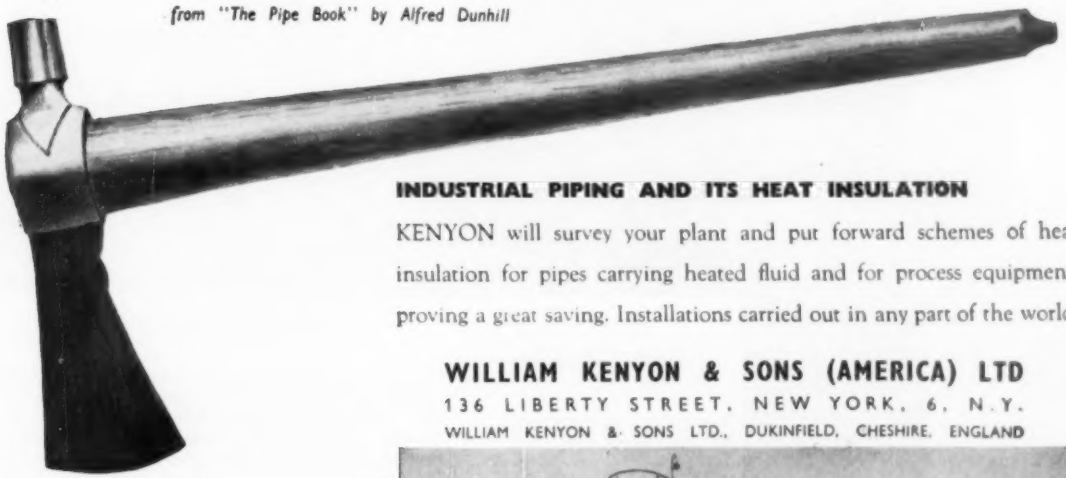
PIPES with a difference...

TOMAHAWK PIPE

Since the Indian brave carried a tomahawk, it was not unnatural that this weapon should be made to serve also as a pipe in the ingenious manner shown in the illustration. But this device was most probably the work, in the first instance, of a European craftsman, for both English and French supplied the Indians with "trade" tomahawks of steel.

from "The Pipe Book" by Alfred Dunhill



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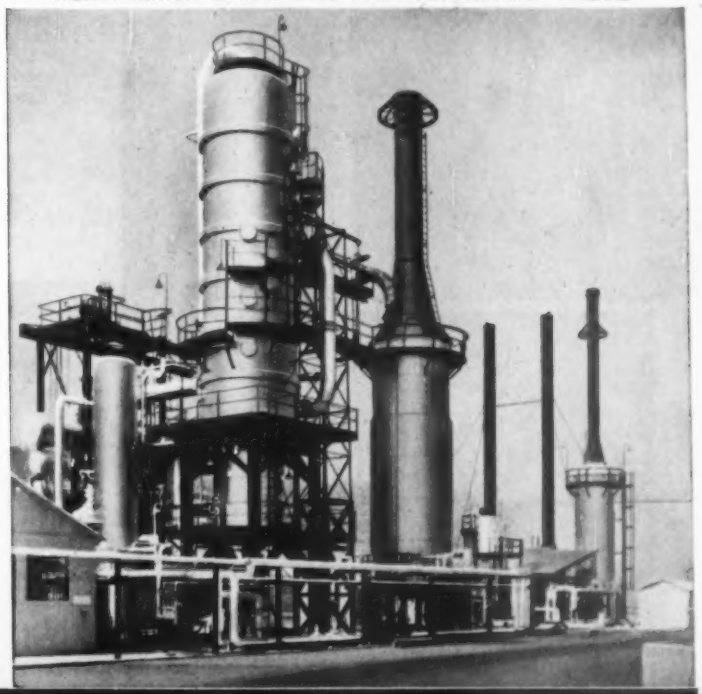

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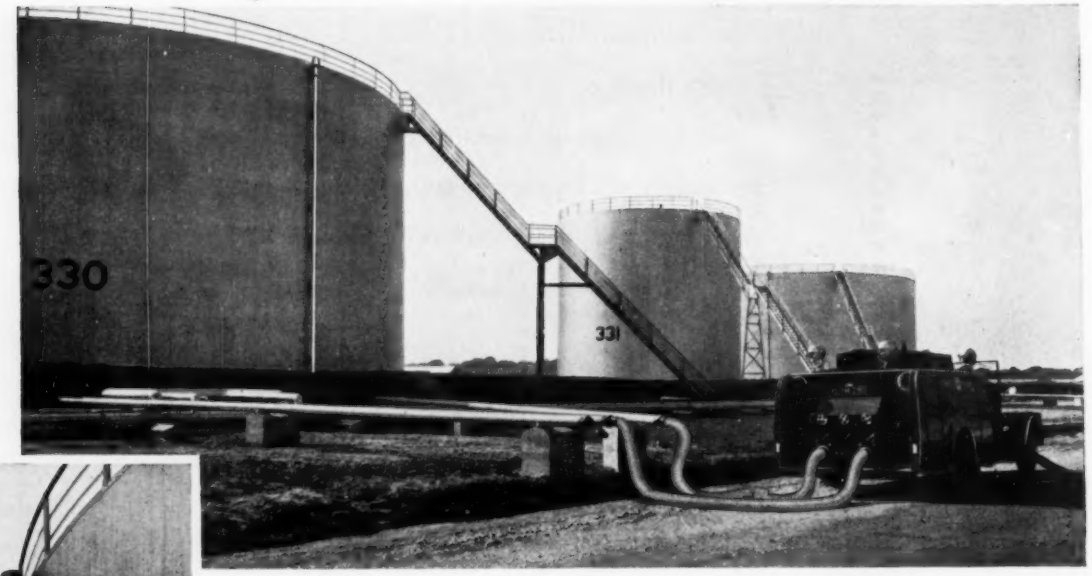
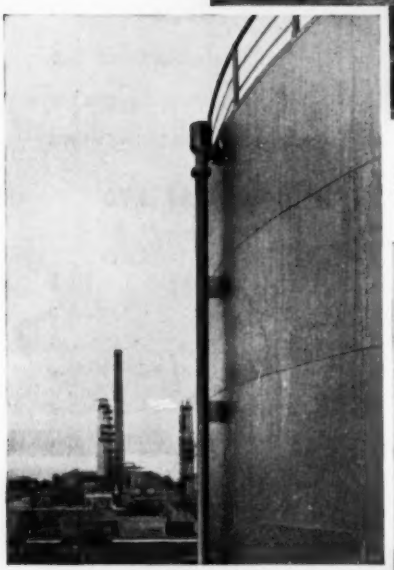
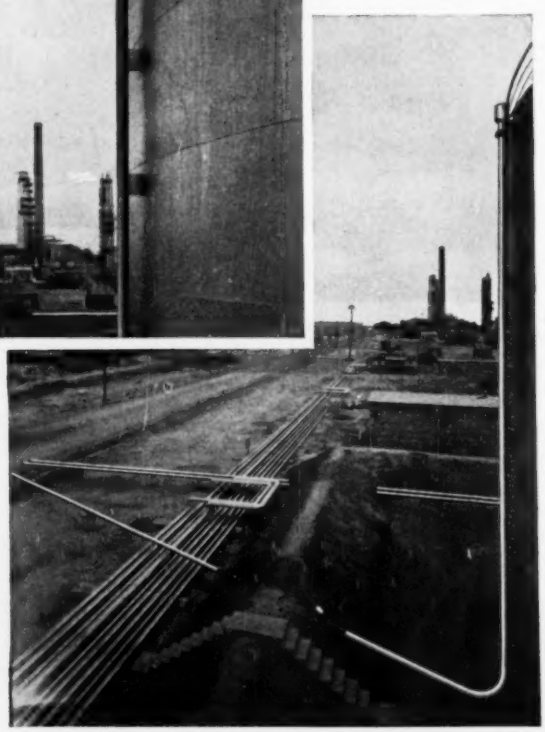


(Above) one of the foam tenders showing the method of coupling foam delivery hose to foam risers.



(Left) a Pyrene foam riser terminating in a Chamber Type Seal Box.



System of foam supply pipes showing how they are extended through the bund to the roadway.

To secure the highest degree of fire safety at FAWLEY, the ESSO Petroleum Company have installed an extensive range of "PYRENE" Fire Fighting Equipment. Two "Pyrene" Refinery Foam Tenders provide a powerful fire fighting force to meet all major fire risks throughout the refinery plant and tankage area. Each of these vehicles is capable of producing 4,500 imperial gallons of foam per minute for 30 minutes. There is also an ancillary "Pyrene" Tender designed to carry spare "Pyrene" Foam Compound, additional portable "Pyrene" Foam-making Branchpipes, hoses, nozzles, adaptors, etc., and self-contained floodlighting equipment. The fourth vehicle in this fleet comprises a tanker that carries a reserve supply of 2,500 imperial gallons of Foam Compound. The total foam output available from the foam compound carried on all four vehicles is approximately 770,000 imperial gallons. Each of the cone roof tanks is fitted with "Pyrene" dry foam risers terminating in foam chambers that incorporate a vapour

One of the corridors of the Main Office building which is protected throughout with Pyrene C.55, CO_2 water-type extinguishers.

OIL REFINERY

with

Pyrene TRADE MARK

FIRE FIGHTING EQUIPMENT

(Above) the fleet of three Pyrene Foam Tenders that provide mobile protection for the Refinery and Storage tanks.

seal. Foam supply pipes carried outside the bund facilitate quick connection to foam couplings on the tenders. Portable "Pyrene" Foam Towers fitted with No. 20 size Foam Branchpipes are provided for Floating Roof Tanks. Two of these towers, each producing 1,600 imperial gallons of foam per minute, can be operated from one tender. "Pyrene" PD.20 CO_2—Dry Chemical Fire Extinguishers, CO_2 equipment and "CONQUEST" C.55, CO_2-water-type extinguishers, dispersed throughout the site provide first-aid fire protection for the laboratories and office buildings.

THE PYRENE COMPANY LIMITED, (Dept. W.P.I)
9, Grosvenor Gardens, London, S.W.I, England
Telephone : VICToria 3401. Cables : Pyrene, London.

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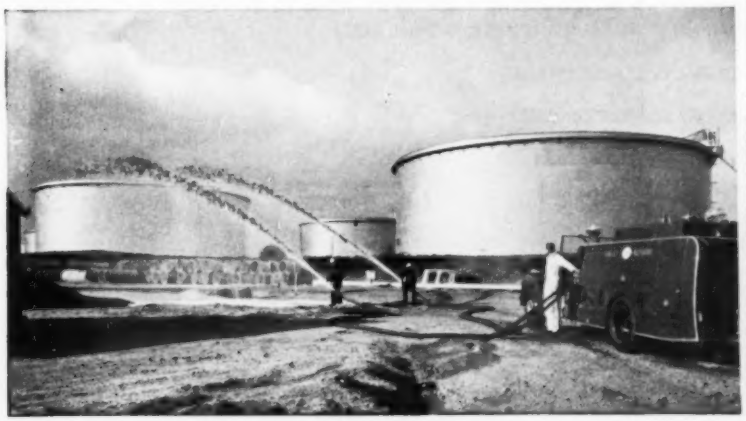

One of the Pyrene Foam Tenders using No. 10 size Foam Branchpipes to project two foam jets.

Pyrene Telescopic foam tower, fitted with a gooseneck pourer. This model extends to a height of 50 feet.

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From a speech by Frank W. Abrams, Chairman of the Board, Standard Oil Company (New Jersey)

STANDARD OIL COMPANY (NEW JERSEY)

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ONLY 4-WHEEL-DRIVE

...Goes Everywhere in the Oil Field!

Oil men judge a vehicle by its ability to take them wherever they have to go. Experience has taught them that nothing less than 4-wheel drive gives them the kind of transportation they need. That is why the 4-Wheel-Drive Willys Station Wagon is so widely used to carry personnel, supplies and equipment *everywhere* in the oil field. We will gladly send you complete information about this vehicle, and the name of the nearest Willys-Overland dealer, upon request.

PROSPECTING is easier when exploration parties use the 4-Wheel-Drive Willys Station Wagon to reach places where other vehicles cannot go.

DRILLING delays are reduced to a minimum when this car keeps crews supplied with the tools and equipment needed for any emergency.

PIPING is another oil field activity speeded by this "go-anywhere" vehicle as it shuttles back and forth with inspectors, maintenance men and replacement parts for heavy machinery.

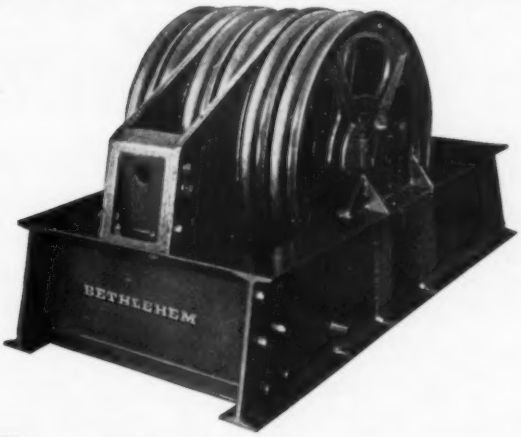
4 Wheel-Drive WILLYS STATION WAGON

WILLYS-OVERLAND EXPORT CORPORATION
Toledo 1, Ohio, U. S. A.

For Truly Balanced Performance

EQUIP YOUR RIG WITH

ALL THESE BETHLEHEM COMPONENTS



For smoothest, fastest, most trouble-free operation, all drilling-rig components should work in complete harmony. Bethlehem makes this possible with matched sets of crown and traveling blocks, swivels, and rotary tables. From Bethlehem's wide assortment you can select the combination that meets your needs exactly.

CROWN BLOCKS—4 sizes. Capacities, 80 to 350 tons.

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ROTARIES—2 sizes, 17½-in. and 21-in. Capacities to 18,000 ft. with 4½-in. drill pipe. Also available as unitized outfits with Hydrodrive and independent prime mover.

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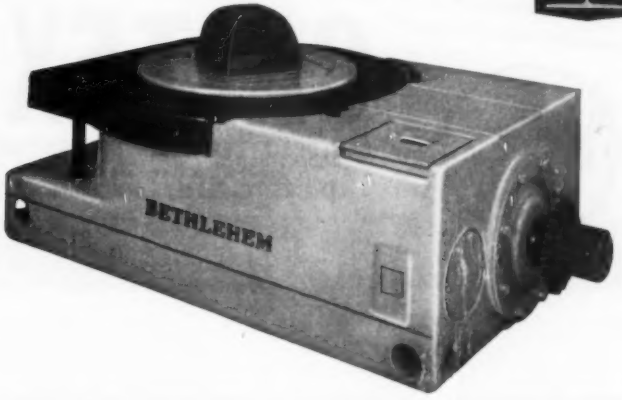
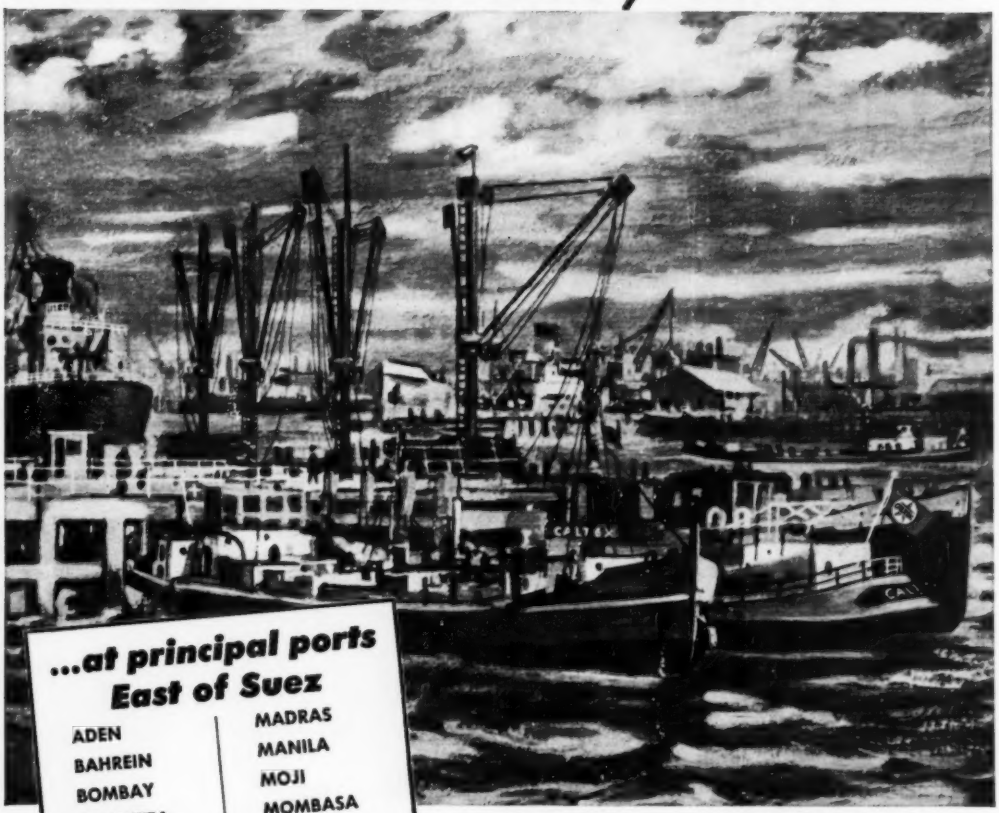
Cable Address: "BETHLEHEM, NEWYORK"

BETHLEHEM STEEL



Note: Bethlehem manufactures a full line of slush pumps and draw-works for shallow, medium, and deep drilling; and, for production work, pumping units in a wide range of sizes and types. Write for full information.

OIL AT WORK~ *halfway 'round the World*



...at principal ports East of Suez

ADEN
BAHREIN
BOMBAY
CALCUTTA
CAPETOWN
COCHIN
COLOMBO
DURBAN
HONG KONG
KARACHI
KOBE
LOURENCO MARQUES
MADRAS
MANILA
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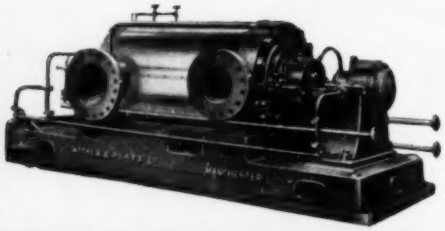
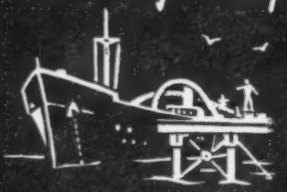
Centrifugal Pumps & FLAMEPROOF MOTORS

Main Pipeline Pumps....

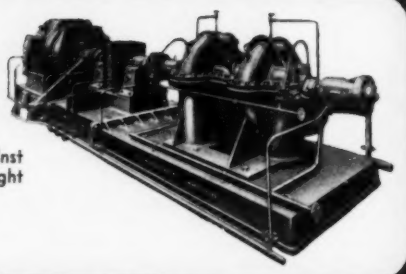


Mather & Platt multi-stage 'Plurovane' pumps were amongst the earliest centrifugal pumps installed for main line work. The pump shown on the left is a typical modern 'Plurovane' designed for a throughput of 50,000 bbls/day of crude oil against a pressure of 750 p.s.i. when running at 1500 r.p.m.

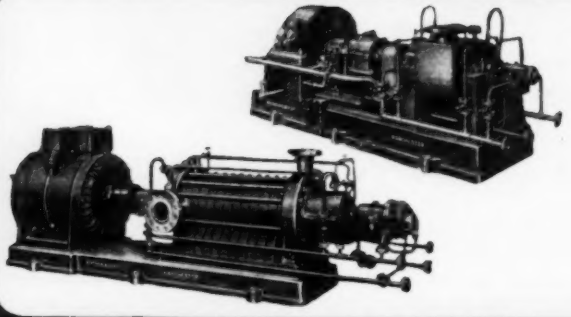
Transfer and Loading Pumps



Our standard ranges include a pump for nearly every transfer or loading duty. The two-stage "Medivane" pump illustrated on the right can handle 700 tons/hr. of crude or products against heads up to 500 ft. It is driven through a gas tight wallbox by a 550 h.p. Mather & Platt Motor.



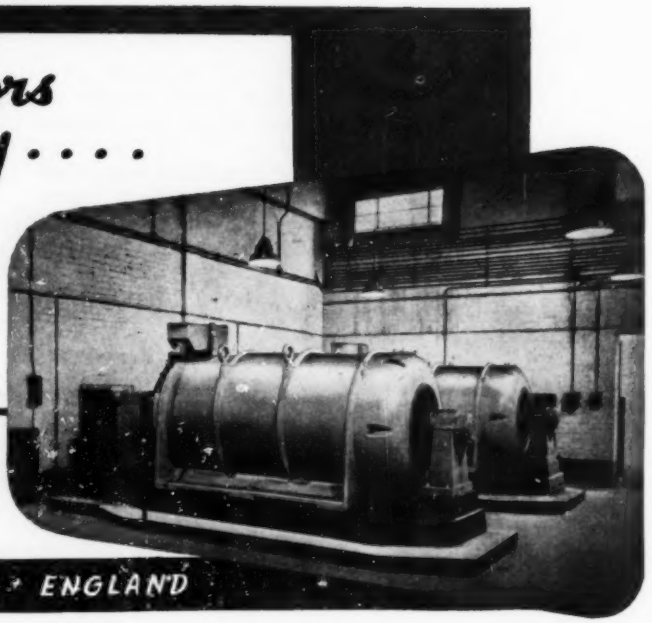
Refinery Process Pumps



Our long refinery experience at home and abroad enables us to supply pumps for the most arduous refinery duties. The illustration shows typical units:—a steam turbine driven pump handling oil at 500 degs. F. and a motor driven "Plurovane" pump dealing with light volatile hydrocarbons.

Flameproof Motors on Pipeline Duty....

Mather & Platt electrically-driven centrifugal pumps on an oil pipe line. The motors here illustrated are of the totally enclosed flameproof type, and are of 1,000 h.p. capacity, fed from a 3 phase 50 cycle 6000/6600 volt supply. They are squirrel cage direct-on started machines with a starting current of four times full load value.



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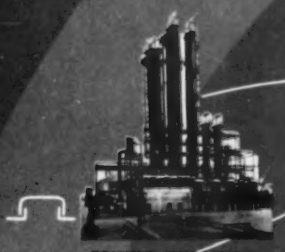
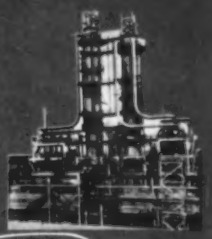
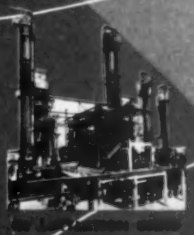
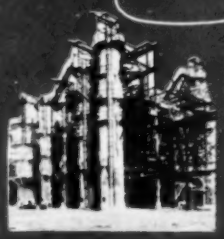




fractionation





more than 2000 fractionating towers, representing many different processes, have been designed and constructed by Foster Wheeler in over 30 years' service to the worldwide petroleum industry.

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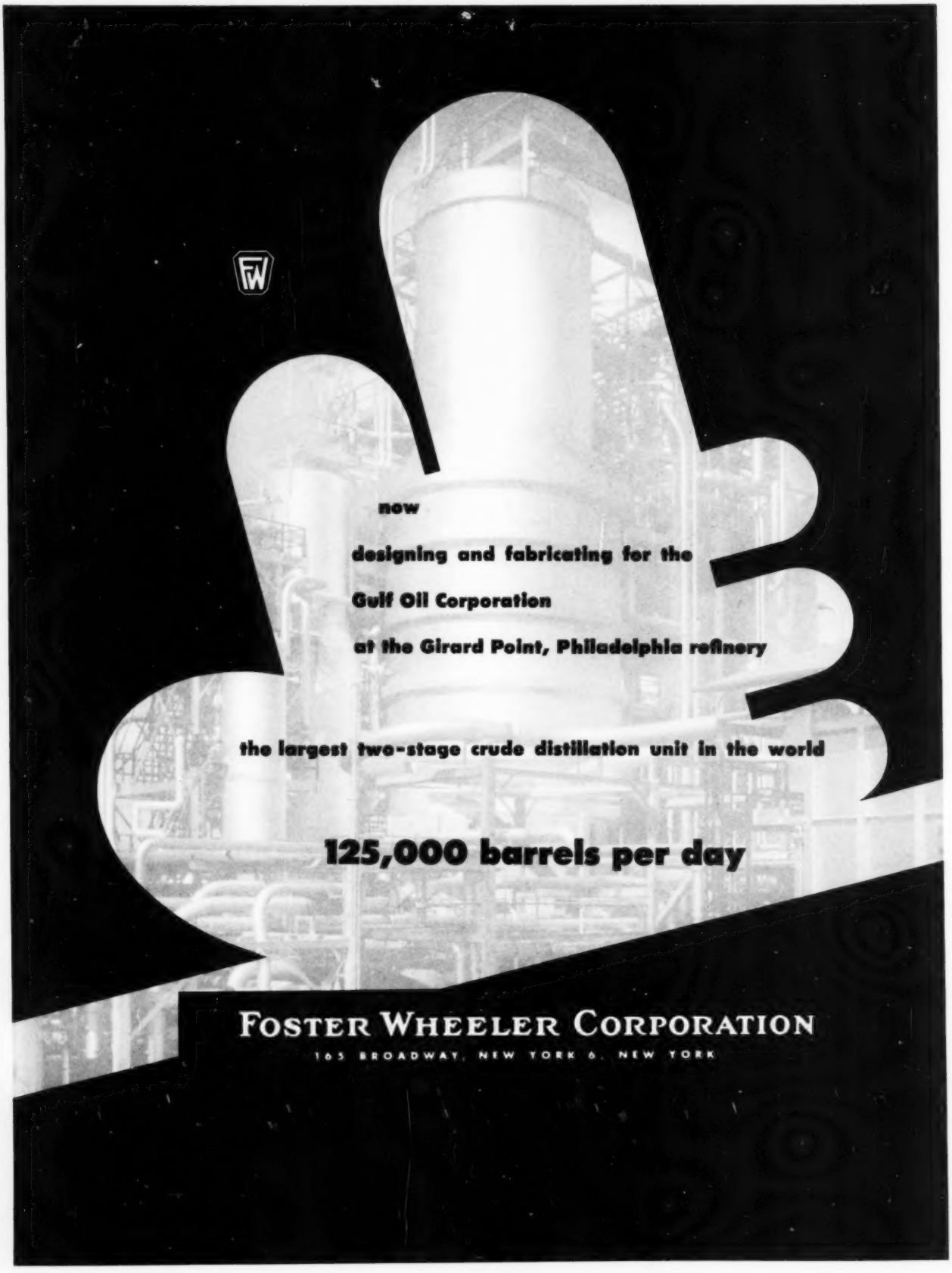
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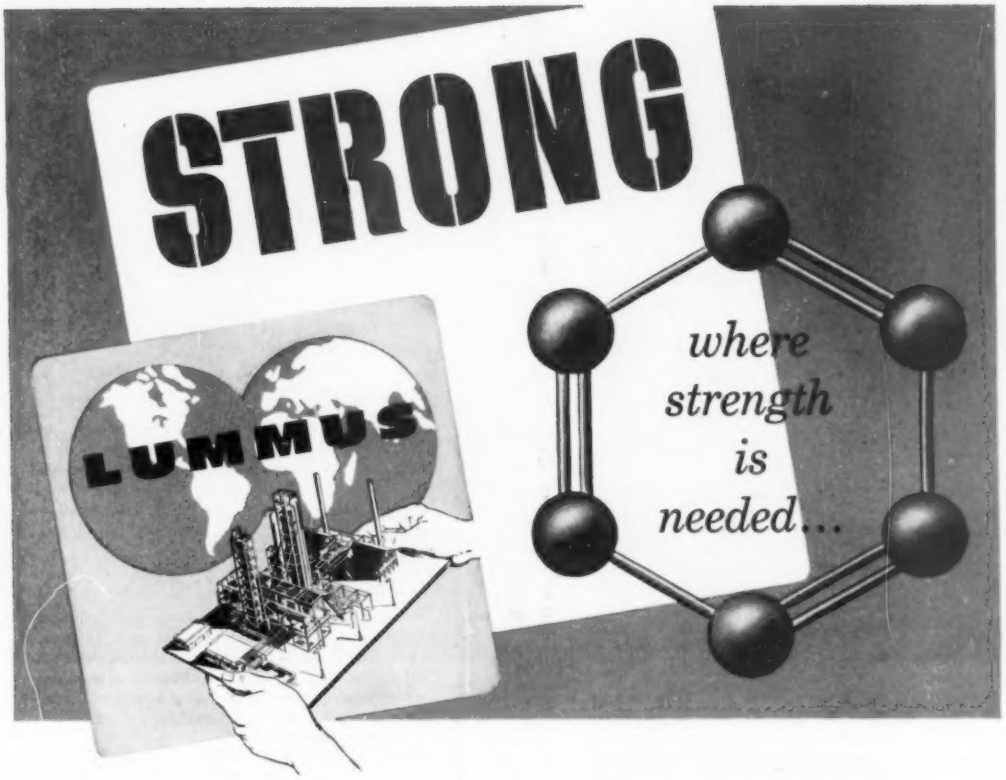

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RADOIL*

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RADOIL is a geophysical technique for the *direct* location of oil. It was developed by William M. Barret, Inc., working in collaboration with its research and manufacturing affiliate, the Engineering Research Corporation. As its name implies, RADOIL employs electromagnetic energy in the form of radio waves to penetrate the earth, and thereby locate and define oil-bearing strata.

HOW DOES RADOIL OPERATE?

A "surface wave" of radio energy is directed along the air-earth boundary from an "energizer" toward a receiver. As the surface wave progresses, individual "rays" peel off by refraction and enter the earth along a multitude of parallel ray paths. As the rays strike a reflecting formation, they are partially reflected back to the earth's surface, and refracted out again toward the receiver. Due to the electrical contrast that exists at the boundary of an oil field, the character of the reflected rays discloses the presence of oil.

HOW DOES RADOIL COMPARE WITH OTHER EXPLORATORY TECHNIQUES?

There is no close parallel. While other geophysical methods seek to define a "structural prospect," RADOIL has as its objective *the direct location of a worthwhile oil field.* This does not mean that RADOIL is designed to replace other methods. On the contrary, in its present development RADOIL is more suited to detailing than to reconnaissance work and, therefore, it is best employed in areas where a prospect has already been localized by other methods. *RADOIL is competitive with the drill,* not with conventional geophysical and geological techniques.

IS RADOIL A PROVEN METHOD?

The cumulative results of more than 300 commercial surveys, conducted during the past 15 years, show that RADOIL is more reliable in determining the presence of oil than conventional geophysical methods are in determining structural conditions favorable for the accumulation of oil.

WHAT DOES A RADOIL SURVEY COST?

Service charges for RADOIL compare favorably with the cost of other geophysical surveys, but it should be remembered that the chief effectiveness of RADOIL begins where other methods leave off; that it bridges the wide gap between a structural prospect and an oil field.

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Experienced RADOIL field crews may be secured on a contract basis, as schedules permit; or on a non-exclusive license basis to responsible parties. An adaptation of the method known as RADORE, has also been developed for use in locating ore deposits. RADORE is available to the mining industry on the bases described above for RADOIL.

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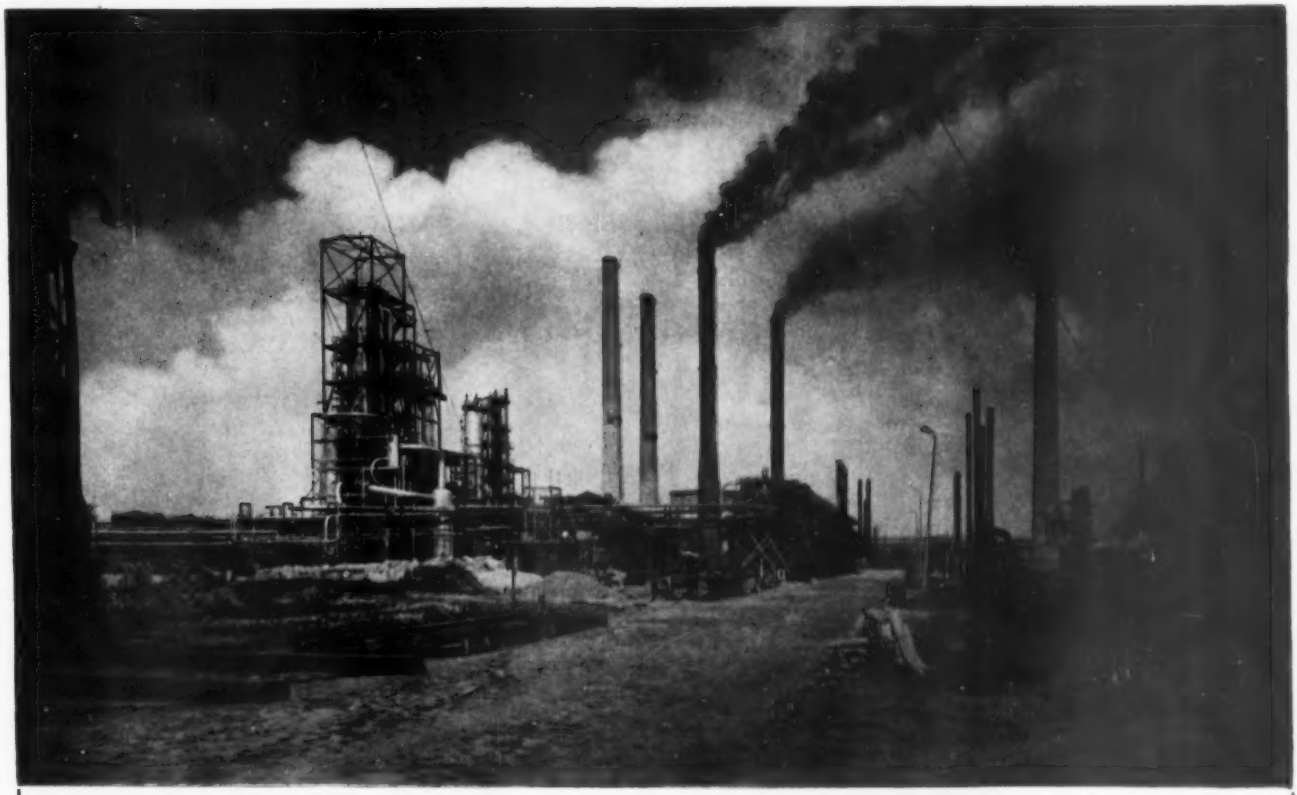

They had a problem... When World-War-Number-Two laid waste many of the largest Oil Refineries in Europe, it also left the world pitiably short of new or replacement plant. In fact Global disruption was complete. Oil Companies were hard put to know where to turn for supplies of more and yet more refining plant. Their normal sources of supply — although working at fever pitch, were still saturated with orders that would take years to complete. But the need for plant was urgent. The Royal Dutch/Shell Group solved their problem, in part, when they turned to Harveys. For Harveys have one of the most modern and fully equipped works in the world for the fabrication of all kinds of heavy and light plant for the Oil and many other Industries. *In fact Yours the problem – Harveys the answer!*

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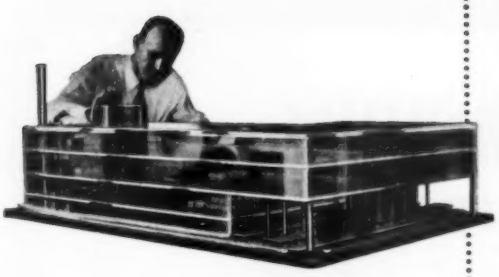

"Model" Grease Plant FOR CANADIAN OIL COMPANIES, LTD.

This lucite, scale model was the "blueprint" used by Fluor engineers to plan and construct the new modern lubricating oil and grease manufacturing plant for Canadian Oil Companies, Ltd., in Montreal. Being able to work out detailed designs in miniature, played a big part in the successful selection and location of all equipment to facilitate the natural flow of work through the plant with a significant saving in man hours. It is an example of the thoroughness with which Fluor tackles a job.

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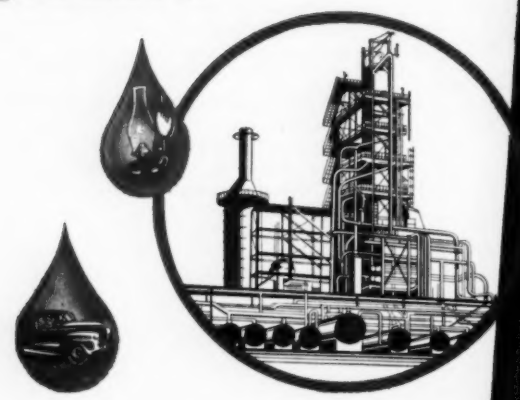

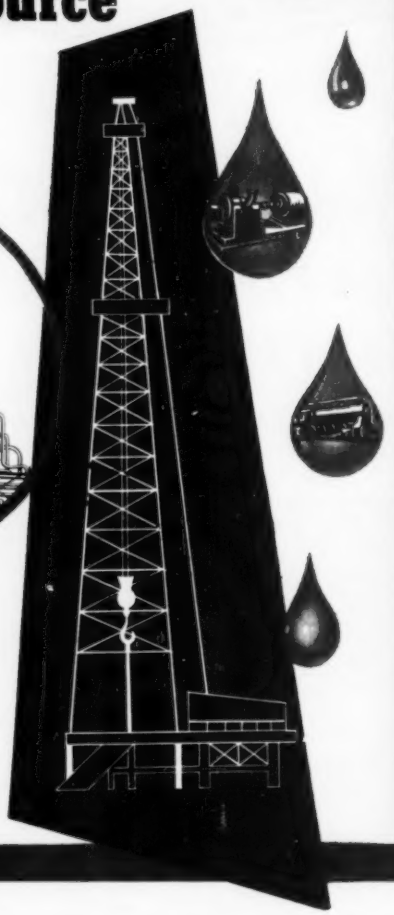

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JANUARY 1952

World Petroleum

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FOUNDED BY RUSSELL PALMER

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J. C. CHATFIELD
Managing Editor

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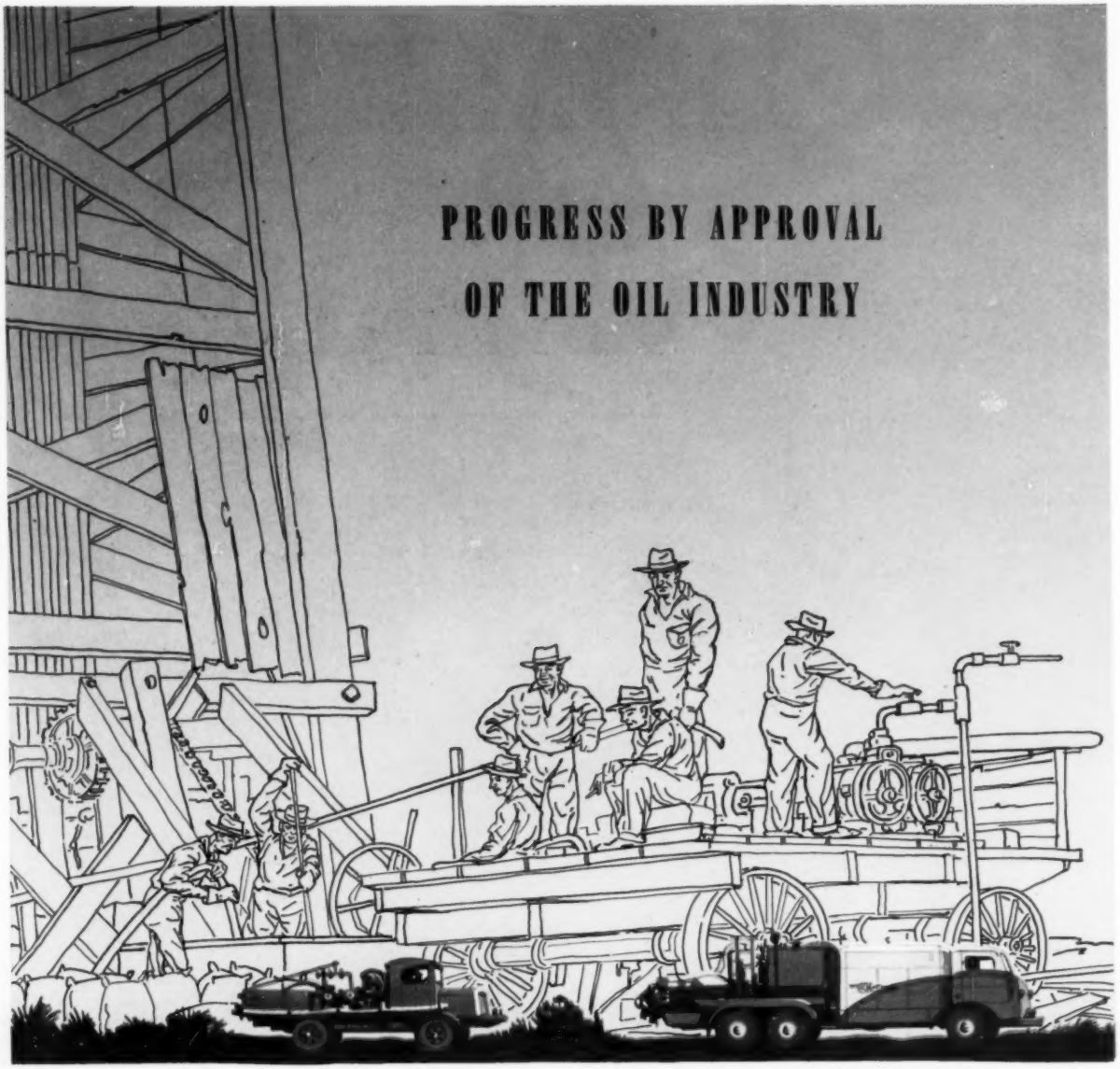
THIS MONTH'S COVER

Within the next few months The Ohio Oil Co. will complete construction of its "Jumbo" line from Wood River, Ill., to Lima, Ohio. This new 22-inch line will have a capacity of 250,000 barrels daily. This month's cover pictures wrapping operations on part of the line. Color plates are reproduced through the courtesy of Robert L. Hazlett, editor of The Beacon, Ohio Oil Co., house magazine.



WELLS were cemented from a horse-drawn wagon thirty years ago. That's how Halliburton began. There soon proved to be a great need for the service Halliburton performed, and the oil industry gave its approval to the *quality* of Halliburton's service. Today, Halliburton is a large organization with highly-trained men and modern equipment helping to produce oil in every part of the world where wells are drilled. That's progress by consent of the industry. But, no matter how well a service is performed, or however great the demand for it, Halliburton will consistently and energetically work for further improvement of its service.

"THERE'S NO SUBSTITUTE FOR EXPERIENCE IN OIL WELL CEMENTING"

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DUNCAN OKLAHOMA

Editorial

Industry Set To Meet Rising Demand

AFTER the notable achievements of its recent history and particularly those of the past twelve months, the oil industry faces 1952 with confident assurance. This is not because of any expectation that difficulties will be less numerous or serious. With every passing year, however, the industry has accumulated a greater store of experience, has built up a more impressive record of adaptability to changing conditions, and has demonstrated repeatedly its readiness to meet emergencies no matter how unexpectedly they may present themselves.

The year just ended has given ample opportunity for display of the industry's resourcefulness in meeting extraordinary demands. Faced by the necessity of finding and producing more oil than ever before to meet the requirements of expanding industry while at the same time adding to the strength and to the defensive power of the free world, it has surpassed the goals set for it. When the sudden withdrawal of more than six hundred thousand barrels from the daily flow of petroleum into the stream of world commerce occurred, a blow designed to paralyze activity in many directions, the industry gave an impressive demonstration of unity in action that filled the gap with scarcely a jolt to the industrial machine.

Reports of oil industry operations for 1951 show an increase of roundly 1,300,000 barrels in daily production over the preceding year, a gain of 12.4 percent, which is larger than in any recent previous year. The gain was widely distributed and many countries contributed to it. Owing to special circumstances, it caused the United States to make a contribution to the international oil supply that would not have been necessary under less exceptional conditions.

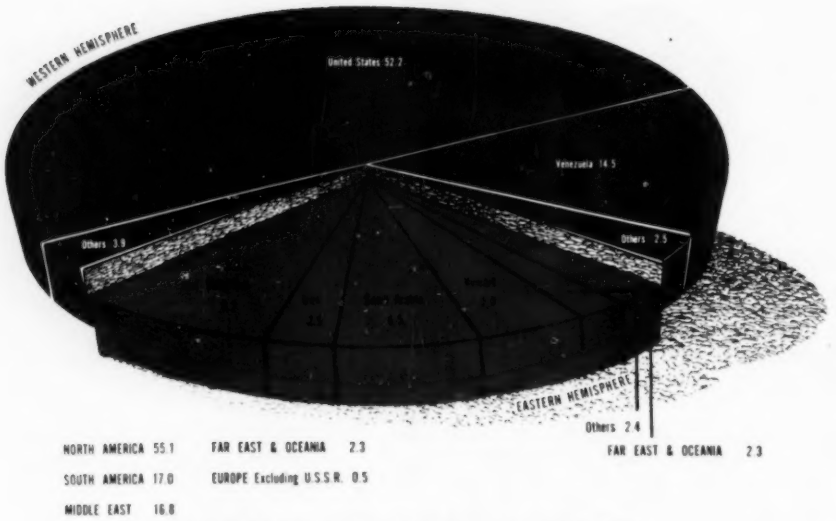
Statisticians and economists who indulge the hobby of attempting forecasts have learned by experience the risk involved in attempting to predict the future course of oil. In the recent past, advance estimates of production and consumption almost without exception have fallen below the actual performance of the industry when it got into action. Nevertheless the making of forecasts will continue, for it is part of the business of those engaged in the operation of the industry to plan in advance for meeting the demands that may be put upon them and to form some estimate of what the requirements are likely to be.

In one respect all estimates of the probable course of the industry during the coming year are in agreement. The only divergence relates to the degree of increase. Some students of oil affairs feel that there may be some slackening during the coming months in the rate of growth recorded in 1951. Among the reasons advanced in support of this opinion are the possible ending of the Korean war, the smaller output of motor vehicles and consequently the reduced number coming into service, and the probable imposition of restrictions upon the use of certain petroleum products.

It is pointed out that stocks of crude oil and some of the principal petroleum products are substantially higher in both hemispheres than at the beginning of 1951, that the growth in consumption has been slower in recent months than in the first half of the year and that the present rate of production is well above current demand. On this basis a probable increase of about five percent is computed as adequate to meet requirements.

On the other hand there is a feeling, practically unanimous among military authorities and all others who are concerned with programs of defense, that the only limit that should be set upon the requirements of the coming year is the maximum quantity that it will be possible to produce. Specialists of the national defense organization of the United States are convinced that the country will need to drill at least as many wells as in 1951, to add greatly to transportation facilities, and to provide an added refining capacity of half a million barrels. Surveying the needs in other lands, including a larger volume of United States imports, they count on a 20 percent increase in drilling and a corresponding expansion in refining and transport capacity outside this country. Their calculations are motivated by the desirability of developing a higher reserve of potential production capacity against possible eventualities.

In these quarters the estimate of a further increase of 10 percent or a little more for 1952 is regarded as the minimum necessary to meet the expanding needs of the world as a whole.



PERCENTAGE DISTRIBUTION OF PRODUCTION

World

Despite the loss

THE international petroleum industry drilled more than 50,000 wells throughout the world in 1951 and produced 4,270 million barrels of crude oil, an average of 11,718,900 b/d. Output was 475 million barrels, or 1,299,600 b/d higher than in 1950, an increase of 12.4 percent.

In addition to meeting the world's requirements for liquid hydrocarbons from petroleum, the industry found new reserves for the future. Producing potentials were increased in the United States, in Venezuela, in Saudi Arabia and in many other nations. Above-ground stocks, including the amount of oil required to fill new pipe lines, increased about 100 million barrels.

This record was made despite the loss of the output of Iranian fields in the last half of the year. The shut-down in that country withdrew about 130 million barrels of crude from the market, causing temporary shortages in aviation gasoline and fuels in Asia.

World consumption of liquid hydrocarbons from petroleum in 1951 is estimated at about 4,380 million barrels (12,000,000 b/d) an increase of 9.3 percent over 1950. This includes 250 million barrels of natural gasoline and benzol.

Having proved to its satisfaction that it is able to meet a great emergency without undue difficulty, the industry faces the new year with confidence.

It is probable that distillates and heavy fuel oils will be scarce in 1952 and avgas will not be in plentiful supply. The heavy movement of coal from the United States to Europe to supplant scarce fuel oil is in itself requiring a very large consumption of fuel oil for bunkering purposes. The high level of industrial activity is contributing to fuel oil shortage. This shortage might, of course, be eliminated if the Abadan refinery should be reopened. In this connection it should be pointed out that a very large amount of maintenance work will have to be done before Abadan can go back on stream. In the salt air of the Persian Gulf maintenance must be continuous if the refinery is kept going and it is clear that little or no work of this character has been done in the past few months.

Advance estimates for the new year suggest that world demand for oil will rise to about 4,700 million barrels in 1952, (12,900,000 b/d) an increase of 7.3 percent. Assuming an output of 290 million barrels of natural gas liquid this means that the world will require about 12,100,000 b/d of crude oil in 1952.

Demand in the United States is estimated at 2,757,000,000 barrels in 1952 (7,533,000 b/d) by the United States Bureau of Mines. This is an increase of 7.1 percent over 1951. Other authorities have estimated a slightly smaller increase but differences are not enough to be significant.

Consumption outside the United States and Iron Curtain countries in 1952 is estimated at 1,574 million barrels (4,300,000 b/d), an increase of nine percent over last year. In the Soviet bloc demand has been increasing at about 8.5 percent per year and it is assumed that this rate will continue. If so, the communists will consume about 380 million barrels (1,040,000 b/d) in 1952 compared with 350 million barrels (963,000 b/d) in 1951.

PERCENTAGE DISTRIBUTION OF PRODUCTION

Principal Nations	1939	1949	1950	1951
United States	60.0	55.5	52.0	52.2
Venezuela	9.8	14.2	14.4	14.5
USSR	10.5	7.4	7.3	6.9
Iran	3.7	6.0	6.4	2.9
Saudi Arabia	0.2	5.1	5.3	6.5
Kuwait	....	2.6	3.3	5.0
Western Hemisphere	76.7	73.3	71.5	72.1
North America	63.2	56.5	54.6	55.1
South America	13.5	16.8	16.9	17.0
Eastern Hemisphere	23.3	26.7	28.5	27.9
Middle East	6.0	15.4	17.3	16.8
Oceania and Far East	4.1	2.3	2.3	2.3
Europe (Including USSR)	13.2	9.0	8.9	8.7

To meet world requirements for oil outside the Soviet zone the Petroleum Administration for Defense of the United States suggests that United States domestic crude production should be increased 3.3 percent in 1952 to 6,350,000 b/d. Elsewhere in non-communist countries it is suggested that production should increase nine percent to five million b/d. This the PAD thinks can be accomplished by drilling 44,000 wells in the United States, the same number as in 1951, and by drilling 5,443 wells in other areas, an increase of 50 percent over 1951.

The 1952 program for the industry proposed by PAD would permit further increases in producing potential as a safety factor in case of emergency. In the United States the surplus potential would be increased by bringing in more foreign oil and decreasing exports. The PAD estimates are based on a continuation of the Iranian shutdown.

During 1951 the United States was called upon for greatly increased exports to make up for the closing of the Abadan refinery. Shipments to export averaged 406,000 b/d for the year compared with 304,000 b/d in 1950, an increase of 33.6 percent. For 1952 the Bureau of Mines estimates that exports will return to about 308,000 b/d.

In 1951 the Iranian situation reversed the trend of recent years during which the United States produced successively smaller proportions of the world's supply of oil. U. S. production of about 6,120,000 b/d represented 52.2 percent of the world's output compared with 52 percent in 1950, 55.5 percent in 1949 and 60 percent in 1939.

Venezuela also increased its share of the world's oil from 14.4 percent in 1950 to 14.5 percent last year. Mexico, Canada and Colombia contributed also with the result that Western Hemisphere production was 72.1 percent of the whole compared with 71.5 percent in 1950.

In the Middle East, Saudi Arabia supplied 6.5 percent of the world's crude last year compared with 5.3 percent in 1950. Kuwait was up from 3.3 to 5.0 percent while Iran fell from 6.4 to 2.9 percent of the global supply.

Russian production figures are estimates based on fragmentary data. Soviet authorities have been somewhat less communicative this past year than heretofore. For the purposes of this report it has been assumed that the rate of increase in Russian output was unchanged in 1951. In the case of Romania the claims of largely increased production have been discounted since no new fields have been found and the administration has been active in secondary recovery operations in an effort to keep production from following a natural

Crude Production Up 12.4 Percent

of Iranian oil in 1951 the petroleum industry increased its output of crude oil to 11,718,900 barrels daily while adding substantially to reserves and above-ground stocks.

decline curve. Only in the Russian zone of Austria is it thought that crude production has been increased materially.

In Western Europe principal development activity was in Germany and France. Wildcatting and development drilling has been particularly active in Germany. Emphasis is moving from salt domes to other types of structures such as those which have proved so prolific at Emsland and Hanover. The first offshore deep test has been abandoned at about 7,900 feet. Step-out wells have extended the Ruehlermoor and Lingen fields. German production for the year was up about 25 percent over 1950 to an average of about 27,000 b/d. In October production had reached nearly 30,000 b/d.

Two new fields were discovered in Saudi Arabia to bring the total in that country to eight. Seven wells have been drilled in the Ithmaniya field south of Ain Dar and four have been completed in the more recently discovered Safaniya field near the northern border of the country. All wells in the two new fields are shut in at the present time pending further test drilling.

The Safaniya field is the first Cretaceous production to be developed in Saudi Arabia. Other fields are producing from the Jurassic. The field extends into the Persian Gulf and thus far two of the completed wells are offshore and two onshore. To do the offshore drilling Arabian American purchased a diesel-electric drilling barge from Creole Petroleum Corp. and towed it from Venezuela to Arabia.

Average production in Saudi Arabia in 1951 was 765,000 b/d compared with 546,700 b/d in 1950, an increase of 40 percent. At the end of the year output was at the rate of 900,000 b/d.

Kuwait production at the end of the year was in excess of 700,000 b/d, double the 1950 average. Total output for the year was 200 million barrels. The Burgan field from which all of the Kuwait oil is extracted is now well outlined. The original drilling pattern of one well to 600 acres has been completed and Kuwait Oil Co. now is running three rigs on fill-in wells. Eventually the pattern will be one well to 200 acres.

Recent Kuwait production has been limited by tanker loading facilities. Even with round-the-clock loading not much more than 700,000 b/d could be shipped. Currently some of the cargo ship berths are being converted to tanker berths and cargo operations transferred to the shore side of the pier where the smaller ships can be berthed much more easily than the super tankers employed in Persian Gulf crude service. About 300,000 b/d additional pipe line capacity is to be built from Burgan to loading spots. It is anticipated that Kuwait output in 1952 will average around 800,000 b/d and may exceed this level.

Iraq production continues to be limited to about 180,000 b/d because of the lack of pipe line outlet. Completion of the new big-inch pipe line to the Mediterranean in the second quarter of 1952 will permit an increase to about 425,000 b/d. Drilling of new wells in the Kirkuk fields has been conducted in anticipation of the completion of the new 26-to-32-inch, 556-mile main line to Banias, Syria.

In Egypt current production is about equally divided between the older Egyptian fields and the newer discoveries on the Sinai peninsula. Sudi has been producing about 11,000 b/d from 10 wells and Asl 12,500 b/d from seven wells. Recent drilling at Asl has been disappointing because of the complexity of the structure. Success ratio at Sudi has been better. The older Ras Gharib field yields about 22,500 b/d from 100-odd wells.

Northern Sumatra, Ceram and parts of Java still are closed to operations because of unsettled political conditions. Only the Krulsa and Kawengan fields in Java are producing. Total output of the two is about 12,300 b/d.

In Central Sumatra, California-Texas interests have continued preliminary field work leading to commercial production from their important discovery. Actual commercial production is anticipated in the second quarter of 1952.

In South Sumatra, developments have been proceeding normally. Current production is about 122,000 b/d. Indonesian Borneo has produced an average of 14,500 b/d so that total output for Indonesia now is nearly 150,000 b/d, an increase of 19,000 b/d.

With five rigs running, British Malayan Petroleum Co. Ltd. has continued the rapid development of the Seria field in British Borneo. Production rose nearly 20,000 b/d in 1951 to about 105,000 b/d at the end of the year.

The outlook for 1952 production in Colombia brightened in November when International Petroleum Co. brought in Totumal No. 1, a good Cretaceous well, in the Magdalena valley on a 124,000-acre concession. The well produced 550 barrels of 25 gravity oil in 12 hours through a half-inch choke on test at 6,740 to 7,215 feet. Additional drilling is to be undertaken to prove up the find. Texas Petroleum Co. also has been encouraged by results of its drilling in the upper Magdalena valley. Sixteen rigs have been active in Colombia recently. Colombian production has been well over 100,000 b/d in 1951, average for the year being about 106,200 b/d compared with 93,100 b/d in 1950.

WORLD CRUDE OIL PRODUCTION

(Thousands of Barrels Daily)

	1939	1949	1950	1951
NORTH AMERICA				
United States	3,465.7	5,046.0	5,402.0	6,120.0
Canada	19.1	57.5	78.3	131.0
Mexico	162.0	167.0	199.0	210.0
Total North America	3,646.8	5,270.5	5,679.3	6,461.0
SOUTH AMERICA				
Venezuela	567.0	1,321.4	1,498.0	1,702.0
Colombia	65.5	81.5	93.1	106.2
Argentina	51.0	63.5	64.0	71.0
Trinidad	52.8	56.5	56.5	56.6
Peru	37.1	40.5	41.2	44.0
Ecuador	6.3	7.2	7.4	7.4
Bolivia	0.6	1.9	1.7	1.5
Cuba	0.3	0.3	0.3	0.3
Brazil	....	0.3	0.8	2.2
Chile	....	0.4	1.6	2.0
Total South America	780.6	1,573.5	1,764.6	1,993.2
WESTERN HEMISPHERE	4,427.4	6,844.0	7,443.9	8,454.2
EUROPE				
Romania	128.5	85.0	89.0	89.0
Austria	11.7	25.0	28.4	44.0
Germany	12.3	16.3	21.6	27.1
Hungary	3.0	10.3	11.5	11.5
Poland	10.7	3.3	3.3	3.3
Netherlands	....	11.8	13.4	13.6
Albania	2.5	6.0	7.7	7.8
France	1.4	1.1	2.4	5.4
French Morocco	....	0.4	0.8	1.5
United Kingdom	0.1	0.9	0.9	0.9
Czechoslovakia	0.2	0.8	0.8	0.8
Yugoslavia	....	1.5	2.6	3.2
Italy	0.2	0.2	0.2	0.3
Total (excluding USSR)	170.6	162.6	182.6	208.4
USSR	603.0	690.0	750.0	810.0
Total	773.6	852.6	932.6	1,018.4
NEAR AND MIDDLE EAST				
Iran	214.0	561.0	665.5	341.6
Saudi Arabia	10.8	477.0	546.7	765.0
Iraq	84.5	85.0	136.2	174.6
Kuwait	....	242.0	345.0	568.0
Bahrein	20.8	30.0	30.0	30.0
Qatar	....	....	33.7	48.4
Egypt	12.8	43.5	45.3	44.1
Turkey	....	0.3	0.2	0.3
Total	342.9	1,438.8	1,802.6	1,972.0
FAR EAST AND OCEANIA				
Indonesia	170.0	115.9	132.5	148.4
British Borneo	20.0	70.5	84.8	102.0
New Guinea	....	4.8	4.8	4.8
India	28.0	5.3	5.3	5.2
Pakistan		2.6	3.5	3.1
Burma		1.0	1.6	2.0
Japan	7.3	3.7	5.7	6.8
China	....	2.0	2.0	2.0
Total	225.3	205.8	240.2	274.3
EASTERN HEMISPHERE	1,341.8	2,497.2	2,975.4	3,264.7
WORLD TOTAL	5,769.2	9,341.2	10,419.3	11,718.9

Record Expansion Charted for

By Joseph B. Huttlinger

50 Percent Increase in Foreign Drilling Proposed

WASHINGTON

RECOGNIZING the interrelationship between oil production in the international field and the industry in the United States, the Petroleum Administration for Defense has prepared a survey of anticipated developments abroad in 1952. The subject has a practical bearing upon the domestic program because of its influence upon probable export demand upon this country for petroleum products and because part of the business of the oil administration is to provide steel for the use of American companies operating abroad.

The estimates that have been prepared anticipate an increase in production abroad that will satisfy a continuation of the rapid growth in demand that has been underway in practically all parts of the world during the past few years along with a corresponding expansion in refining and transportation facilities. It is expected to provide for the imports needed by the United States and constitutes a program that has the approval of PAD as reasonable under the assumption that existing conditions will continue to prevail.

The expansion program for countries outside the United States and the Iron Curtain areas but including Canada may be summarized about as follows:

(1) A total of 5,400 new wells, about 50 percent more than in 1951.

(2) Crude production to advance to about five million barrels daily, nine percent above the 1951 level.

(3) Crude runs to stills in existing refineries to rise by 480,000 barrels daily, to a total of 4.5 million barrels daily.

(4) New refining capacity of 340,000 barrels daily to be installed and put into service; major areas for refinery construction are the United Kingdom, Continental Europe, South America and Canada.

(5) Fourteen important crude oil pipe lines, aside from gathering and connecting lines, are to be completed during the year, seven in the Middle East and five in Venezuela; they will have a length of 1,200 miles and will add 2.5 million barrels daily to capacity.

Perhaps the most striking increase is seen in drilling activity. The Canadian program, for instance, calls for 2,000 new wells; this compares with about 1,200 drilled in 1951, or a 66 percent increase. Drilling elsewhere abroad is expected to sink 3,443 new holes in comparison with 2,435 drilled in 1951, an increase of 45 percent.

In detail the program for new wells in the free world outside the United States is shown with anticipated increase in daily crude output in Table I.

Table I

	1952 New Wells	1952 Crude Production	Increase Over 1951
Canada	2,000	145,000	20,000
Venezuela	1,424	1,744,000	106,000
Mexico	482	210,000	*
Argentina	246	*	—
Trinidad	*	56,000	—
Colombia	—	120,000	10,000
Other Western Hemisphere	464	120,000	2,000
Total Western Hemisphere	4,891	2,395,000	138,000
Middle East	153	2,240,000	247,000
Iraq	—	—	80,000
Other Middle East	—	—	167,000
North Africa	4	49,000	—
Ethiopia	2	—	—
Far East	274	—	—
Indonesia	—	170,000	20,000
Borneo	—	100,000	—
Europe	67	45,000	—
Total Eastern Hemisphere	552	2,620,000	270,000
Totals	5,443	5,015,000	408,000

* No breakdown; figures included with totals.

In explanation of the target set for new wells, which is based on the projected increase of production, Bruce K. Brown, deputy administrator of the petroleum agency, says:

"If the total program by oil companies operating outside the United States is to be realized, 5,443 new wells will have to be drilled in foreign areas during the year. About three-fourths of these will be necessary to maintain the 1951 production rate of 4,600,000 barrels of crude a day. The other fourth would make up the contemplated increase of more than 400,000 barrels a day.

"Goals for foreign production have been set high in an effort to take care of an expected rise in foreign demand as well as a probable increase in United States imports."

On the subject of refinery expansion, PAD says:

"The 1952 foreign program contemplates operation of refineries outside the United States at a record level of 4,400,000 barrels daily, more than 480,000 barrels a day above estimated 1951 refinery runs. If this level can be reached, an estimated 40 percent of total world crude runs to stills in 1952 will be in plants outside the United States."

The breakdown of expected runs to stills is shown in Table III, the figures being in barrels per day representing year-long averages.

Minimum figures for added refining capacity expressed in the yearly average of barrels per day are detailed in Table IV.

Pipe line construction plans contemplate

Table II

CRUDE OIL PIPE LINES SCHEDULED FOR COMPLETION 1952

Country	Company	From	To	Size	Length (miles)	Capacity b/d	Tons of Line Pipe
Saudi Arabia	Aramco	Ain Dar	Abqaiq	20-22"	20	100,000	3,000
Saudi Arabia	Aramco	Uthmaniyah	Abqaiq	30-31"	55	200,000	14,000
Kuwait	Kuwait	Burgan Field	Ahmadi Farm	20"	14.5	300,000	2,250
Kuwait	Kuwait	Burgan Ahmadi	Gravity Loading Line	30"	6.5	300,000	1,960
Iraq	Mosul	Ainzalah	Kirkuk Line	12"	140	26,000	12,600
Iraq	I.P.C.	Kirkuk	Banias (Syria)	30"-233 32"-233 26"-90 12"-65	556	314,000	154,000
Iraq	Basrah	Zubair Field	Fao	16"-10	75	52,000	7,500
Venezuela	Creole	Ule	Amuay	26"	125	200,000	25,200
Venezuela	Creole	Lagunillas	La-Salina	34"	25	175,000	8,400
Venezuela	Meneg	Anaco	Pt. La Cruz	26"	30	300,000*	6,300
Venezuela	Meneg	Officina	Anaco	16"	15.5	290,000*	1,600
Venezuela	Shell	Palmarejo	Cardon	30-32" (20"-10 miles under lake)	145	200,000	42,000
Totals					1,217	2,457,000	278,810

* Includes present and proposed capacity.

International Industry in 1952

an enlargement of land transportation facilities that will enable the system to carry nearly half the world's crude oil production outside the United States. The mileage listed is exclusive of a number of projected short lines. Probably the most important crude oil line to be completed during the year is the Iraq Petroleum Co. line from the Kirkuk fields in Iraq running 550 miles to the Mediterranean at Banias, Syria. The 26-30-32-inch line will carry an estimated 314,000 barrels daily of crude, and explains the PAD estimated jump in Iraq crude oil production of 80,000 barrels daily. The list in Table II includes the principal lines, though it is pointed out that others may have to be laid in order to take care of the increased flow of crude and products.

Shipbuilding activities of the oil and transportation companies will add 1,800,000 to 2,000,000 deadweight tons of new tanker space during 1952. This should be sufficient to handle water transportation except for possible tight spots in the winter months.

On supply conditions PAD offers some general forecasts, assuming an unchanged world situation:

(1) Aviation gasoline will continue in rather tight supply.

(2) Motor gasoline will be adequate at present quality.

(3) Kerosine may be short during seasons of the year when demand is especially high.

(4) Gas oil and diesel fuel will be sufficient for anticipated needs.

(5) Residual oil will be in extremely tight supply.

(6) Lack of manufacturing capacity may limit a rising demand for lubricating oils.

Actual expansion of oil industry facilities may be larger than the 1952 program indicates for two reasons. First, the figures on increased production, runs to stills and new refinery capacity are year-long averages compared with 1951 averages; the end of 1952 is bound to see operations at even higher levels. Second, the figures are based on a continuation of the shutdown of Iranian oil operations; if activity were to be resumed in Iran the PAD totals would be boosted by 150,000 barrels daily of crude oil production and 450,000 barrels daily of product output from the refinery at Abadan. It is not expected however that more than a small part of the former Iranian output can be restored at best.

Meanwhile the United States program contemplates a second year of record drilling, designed to punch 44,000 new wells into the earth, an expansion of refinery capacity by 300,000 to 500,000 barrels daily, and a continued expansion of pipe line construction activity. All of this is considered no more than the minimum necessary to keep world production in pace with ever growing demand.

It should be pointed out that the 1952 program, far from being a vague estimate, is a definite blueprint based on applications submitted to and approved by the petroleum agency. Assuming close to normal conditions, no war and uninterrupted rise in demand, the expansion probably will go along as charted. If the steel situation eases, greater expansion may be undertaken. The coming year, thus, is destined to see a worldwide expansion of the petroleum industry, both in areas within and without the United States, at a rate equaling and perhaps exceeding the greatest in the past history of the industry.

Table III

	1951 Runs (est.)	Proposed 1952 Runs	Increase
Canada	340,000	360,000	20,000
Other Western Hemisphere	1,589,000	1,689,000	100,000
United Kingdom	275,000	400,000	125,000
Other Europe	739,000	920,000	181,000
Middle East	668,000	695,000	27,000
Far East	277,000	303,000	26,000
Other Eastern Hemisphere	63,000	70,000	7,000
	3,951,000	4,437,000	486,000

Table IV

	1951 Capacity	1952 Capacity	Increase
Canada	365,000	397,000	32,000
Other Western Hemisphere	1,695,000	1,764,000	69,000
United Kingdom	295,000	387,000	92,000
Other Europe	840,000	947,000	107,000
Middle East	907,000	924,000	17,000
Far East	334,000	347,000	13,000
Other Eastern Hemisphere	143,000	155,000	12,000
	4,579,000	4,921,000	342,000

Ten Million Tons of Steel Required

TEN million tons of steel is the 1952 hope of the oil and gas industry as it prepares to maintain and expand operations in the United States and abroad during the coming year. Figures for exact comparisons with the past are elusive, but the total is admittedly close to an all time high in steel demand for direct industry use. The program is set out in a 1952 steel budget prepared by the Petroleum Administration for Defense. The document constitutes a PAD request for allocations of this steel to the industry.

High level operations would be supported if the tonnages were forthcoming. They are based on the need to keep the oil industry expanding at a normal rate to meet growing demand, and then expand some more to build a production reserve against the threat of possible war demands. A schedule of 44,000 to 45,000 well completions in the United States, the projected construction or extension of a score of oil and gas pipe lines in this country and another dozen abroad, and the addition of up to half a million barrels of refining capacity is envisioned if the tonnages come through.

The petroleum agency would like to raise the target. More line pipe up to 800,000 tons more a year and more oil country tubular goods are needed, it believes. Refinery expansion allowances might well be raised 50 percent in its opinion. But against the prospect of an upward revision in the request is the probability of reduction in actual allocations under the controlled materials plan. Experience over the past nine months indicates that cuts ranging from 10 to 25 percent are not unlikely.

It is anticipated, however, that the industry will get its minimum essential quantities of steel. An operator may be pinched for drill pipe here and for structural steel there, but overall the supply of steel for the industry is expected to come within a few percentage points of rock-bottom demands. This is not to say no steel shortages are ahead. The fact is that even a slight shortage can create hardships for the industry and the nation. And slight shortages appear likely. Added to the PAD request should be the capacity of foreign mills, several of which are turning out volumes of smaller sizes of pipe for the oil industry.

Analysis of the domestic requirement shows production seeking more than three million tons of steel. Of this, nearly two million tons is oil country tubular goods, a volume designed to support 45,000 new wells. Another million tons is for oil field machinery and equipment. Prospects are said to be good that much, if not all of this steel, will be allocated to the industry. A larger supply of

oil country tubular goods may be asked, and whether it comes depends upon capacity of the mills. If conditions permit, the drilling goal may be boosted as high as 50,000, a figure used publicly by Interior Secretary Oscar L. Chapman, Petroleum Administrator for Defense. A drive to persuade mills to emphasize "footage rather than tonnage" by turning out more smaller diameter casing, is making progress. A committee of the National Petroleum Council is to make a report on the matter in January.

For oil and gas transmission, a total of 4.5 million tons of steel is sought. Much of this is line pipe, although some plate for storage facilities is embraced. The figure breaks down to 2.5 million tons for gas lines, and nearly two million tons for oil. Past history and mill capacity indicate possible slashes of 25 percent or more. In that event the petroleum agency will have to decide how to divide the reduced allocations between gas and oil.

Allotments issued by PAD to ten large crude oil lines and five product lines besides a few small crude and terminal projects for the first quarter of 1952 call for 314,949 tons of steel out of total requirements of 766,737 tons for these lines.

STEEL REQUIREMENTS FOR 1952

	Total Steel (Tons)	Carbon	Alloy
Domestic, Regular			
Production	1,952,004	1,692,000	260,000
Natural Gas & LPG	421,980	400,000	21,980
Gas Transmission	2,550,204	2,547,000	300,204
Oil Supply & Transmission	1,773,800	1,772,000	1,800
Refining	515,800	492 000	23,800
Marketing	29,000	.....	29,000
Oil field machinery	921,700	631,000	286,700
Total	8,164,488	7,534,000	923,484
Domestic MRO: Maintenance, repair and operations			
Production	134,000	119,000	15,000
Natural Gas & LPG	22,440	22,000	440
Gas Transmission	125,600	125,000	600
Oil Supply & Transmission	99,410	99,000	410
Refining	105,200	94,000	11,200
Marketing	23,000	23,000	...
Total	509,650	482,000	27,650
Total Domestic	8,674,138	8,016,000	951,142
Foreign, except Canada	862,000	795,000	67,000
Canada	309,600	299,000	10,600
Grand Total	**9,845,738**	**9,110,000**	**1,028,742**

More than 350 natural gas projects are to receive steel in the coming year. Among those high on the priority list are five long distance lines set for completion in the second and third quarters which will have a total length of over 3,500 miles and a daily capacity of roundly two billion cubic feet. Their steel requirements are placed at 694,500 tons and they represent an investment of $326,000,000.

For the refining branch of the industry, a total of half a million tons of steel is sought for expansion, and another 100,000 tons or so for maintenance, repair and operations. This would provide for enlargement along the lines of PAD's objective of a million barrels daily of new capacity in three years. The prospects are, however, that the petroleum agency will raise its sights on the refinery program by 50 percent, if there is the slightest chance of finding steel to support such an increase. Part of the refinery expansion program is being pushed by the military authorities with millions of government funds for alkylate and other facilities used to meet the demands of the military.

Plans filed for a dozen of the larger companies call for an investment of some $550,000,000 in refinery additions during the current year. They include expansion of basic refining capacity, cat-cracking equipment, platforming, output of aromatics, alkylate, sulfur and petrochemicals.

Another half million tons of steel is sought for natural gas production and processing. This includes facilities for the rapidly-growing liquefied petroleum gas branch of the industry. The steel would go for field gathering, compressing, processing, dehydration, desulfurization, and equipment needed to distribute LPG.

The marketing end is down for 29,000 tons of steel, to be used for drums, pails, cans, storage facilities and the like. The PAD breakdown, in the case of domestic needs, is separated by regular allocations, and smaller amounts for maintenance, repair and operations.

Aside from the preceding is the program for companies operating outside the United States, for which a total of nearly 1.2 million tons of steel is sought for programs detailed on pages 32 and 33.

New Plantation Line Doubles Company's Transport Capacity

A NOTEWORTHY addition to the oil transportation facilities of the United States is the new section of the Plantation Pipe Line system which was officially put into operation on Dec. 4. The opening ceremonies were held at Bremen, Ga., which is the location of one of the company's principal pump stations and delivery terminals. Governor Herman Talmadge of Georgia was the speaker of the day and pressed a button to start a shipment of petroleum products on its way through the line.

The original Plantation line was completed ten years ago extending from Baton Rouge, La., to Greensboro, N. C., a distance of 700 miles. It was designed to supply products to the markets of the six southeastern states and consisted, with lateral branches, of 1,261 miles of 12-inch and 10-inch pipe and was able to handle 95,000 barrels daily.

Expansion of the system was dictated by the rapid growth in consumption of petroleum products in the territory served, which has increased approximately 100 percent in the past decade. The new line closely parallels the route of the earlier one, extending from Baton Rouge to Charlotte, N. C. It is equipped with pipe of 18-inch and 14-inch diameter and will more than double the capacity of the system. The building operation has been under way for the past year and the completed work will represent an investment of $52,000,000.

Construction of the line has been in charge of Williams Brothers Co. of Tulsa, Okla., which has handled the entire job including the hauling, stringing, coating, welding and laying of the pipe. Williams Brothers Co., of which John H. Williams is president, is a reorganization of the well-known firm of Williams Bros. which was responsible for the building of important pipe lines in many parts of the world.

"When the original Plantation pipe line was conceived," said President C. R. Younts, "the six states it now serves were using a little less than two billion gallons of gasoline a year. Today, just a decade later, these same states are burning almost exactly double that amount although nation-wide consumption has climbed only about 60 percent. The growth reflects the great industrial strides the South has made and, equally important, the rising standard of living which this area is enjoying.

"This new pipe line increases the company's system of trunk and branch lines to 1,967 miles. The branches of eight-inch and four-inch pipe serve six delivery terminals located off the main line in Alabama, Georgia and Tennessee. The other 12 terminals are on the main parallel lines."

Gasoline makes up abut 70 percent of the traffic which Plantation transports as a common carrier under federal regulations, Mr. Younts reported. The other products it carries are kerosine, tractor and diesel fuels and heating oils. These products are moved from refining area to delivery terminals along Plantation's mains and branches for 14 oil-marketing companies which use the company's facilities. The 18 delivery terminals are distributed by states as follows: Mississippi, two; Alabama, four; Georgia, five; Tennessee, two; South Carolina, two; and North Carolina, three.

Products are pumped through the lines to these terminals at an approximate speed of 96 miles per day, seven days a week. They are scheduled and pumped through with virtually no mixing in the line. Each shipper gets back exactly the same product it puts into the system. Shipments are made in batches of not less than 25,000 barrels. The marketing companies receive their products into their storage tanks located adjacent to Plantation delivery terminals.

The company's expansion program calls for construction of ten additional storage tanks at Baton Rouge and eight additional tanks at Bremen, each to hold 55,000 barrels. The total tankage on Plantation's system will have a working storage capacity of 150,000,000 gallons.

Completion of new pumping facilities along the new main line at 120-mile intervals is scheduled for early 1952. The program also includes respacing of pumps along the system of 60-mile intervals. This part of the program will be completed by mid-1952.

Standard Vacuum Undertakes Major Expansion Program In India

Self-propelled barge recently put into service in India by Standard-Vacuum.

STANDARD VACUUM Oil Co. has begun a major expansion program in India. The project involves a search for raw materials, construction of a modern refinery, expansion of transportation facilities and the installation of new tankage and other equipment to facilitate distribution of petroleum products in the Indian market. Total cost of the new development may exceed $40 million.

Stanvac was encouraged to make such a large new investment in India by the emergence of a favorable economic climate in that country. The recent agreement to build the $35 million refinery came as a result of guarantees on the part of the government that the refinery properties of the company will not be expropriated for a period of at least 25 years. India is seeking investment of foreign capital in the nation, especially in the development of raw materials and the employment of its nationals in manufacturing enterprises. Because of nationalization trends in some of the Asian countries foreign capital was reluctant to take the risk of investment until the guarantees were given against loss of the properties by government edict.

When India first gained its independence its leaders adopted a rigid nationalistic attitude toward foreign investment. Indian leaders felt at that time that the nation should develop its own economy with its own capital. In this view they shared an opinion which was general in East Asia, Oceania and some other parts of the world. Burma was an outstanding example.

In the period that has elapsed since independence it has become apparent that the Indian economy needs outside capital and technical know-how if the nation is to prosper. This recognition by India constitutes a milestone in the development of the nation. It comes at a time when other countries in both Eastern and Western hemispheres are recognizing that outside capital is needed and that it can be encouraged to undertake foreign risks only if an opportunity for reasonable profit exists and if the foreign investment is safe from seizure.

Under the new Indian national policy it has been announced that the two other major marketers in India, California Texas Oil Co. and Burmah-Shell Storage and Distributing Company also may build refineries of substantial size. To date the Standard-Vacuum program is said to be the first major American investment in India since the nation became independent.

Stanvac began the exploration phase of its program in India last October when an airborne magnetometer survey was begun in a 73,000-square mile area in the Bengal basin. This is said to be the first such aerial reconnaissance undertaken in Asia. Records will be studied by company geophysicists to determine whether an exploration concession should be sought.

In addition to the aerial study at the head of the Bay of Bengal, Stanvac will send two ground geological parties into Tripura in eastern India near the Assam border. This survey work will give employment to several hundred skilled and unskilled Indians. Cost of keeping the six parties in the field will be about $10,000 per month. The area to be studied by the six groups is in the same general area as the only current production in India, the Digboi field. Assam Oil Co. produces about 5,300 b/d at Digboi and refines the product locally. The Digboi crude supplies only about 5.5 percent of the Indian market so the government is quite anxious to have more crude discovered so that imports can be reduced. A reduction in foreign currency requirements would accelerate the rate at which the ambitious Indian public works program can be carried out.

Stanvac has agreed to erect a 19,000-barrel refinery at Bombay to supply a major portion of the company's distribution requirements in India. This plant will cost about $35 million. A party of technicians has arrived in Bombay to plan necessary improvements in harbor and docking facilities near the proposed refinery site so that super-tankers may unload Persian Gulf crude. Completion of the plant is scheduled for 1956.

CONSUMPTION OF PRINCIPAL PETROLEUM PRODUCTS IN INDIA
(Barrels)

	1949	1950
Aviation gasoline	505,000	653,000
Motor gas	4,783,000	5,292,000
Illuminating kerosine	5,963,000	7,128,000
Jet fuel	3,000	5,000
Power kerosine	257,000	295,000
Automotive Diesel (industrial)	1,202,000	1,378,000
Automotive Diesel (bunkers)	24,000	24,000
Industrial Diesel	2,610,000	2,479,000
Bunker Diesel	453,000	388,000
Industrial fuel oil	3,673,000	3,723,000
Bunker fuel oil	2,551,000	2,400,000
Lubricants	4,905,000	5,013,000
Bulk batching oil	430,000	448,000
Asphalt	2,982,000	2,870,000
Grease, wax, specialties	2,058,000	2,173,000
Total products	32,399,000	34,269,000
Barrels daily	88,600	95,400
% increase over previous year	20.1	7.9

A subsidiary company is to be organized in India to own and operate the new refinery. Indians are to be invited to purchase nonvoting preferred stock of the corporation up to 25 percent of the new company's capitalization.

A major expansion and improvement program already is under way in the marketing phases of Stanvac operations in India. This involves the improvement and enlargement of ocean terminals and inland bulk plants, addition of greater storage capacity, the construction of barges for inland and coastal waterway deliveries, and the installation of modern lubricant blending equipment at Calcutta.

Pictured with this article is the first of the company's self-propelled barges which is being put into service along the Cochin-Quilon waterway system of India's southern Malabar coast. This barge was built in India as are other units which will make up the push-tow combinations. A second similar unit is to be built for use in the Calcutta district.

Standard-Vacuum's marketing operations in India date back to the late 1890's when the Standard Oil Co. of New York began selling petroleum products in Asia. The first product to be sold, and still the biggest item for the Indian market, was kerosine. The product was delivered from the United States in sailing ships, packed in five-gallon tins, two tins to the case. Shipments originally were consigned to local agents and retailers. However, before the turn of the century the company had opened its own offices in India and had started operation along the present pattern.

In 1950 Standard-Vacuum had a multi-million dollar marketing investment in India, a substantial increase over previous years. Employees in the distribution and marketing operation numbered nearly 5,400 in 1950 and 99 percent of these were resident Indian nationals.

Standard-Vacuum's chief office in India is at Bombay, the head office for the company's India-Pakistan-Burma-Ceylon marketing division under the supervision of general manager M. H. Banks. Branch offices in India are at Bombay, Madras, Calcutta, Marmugoa and Cochin; can manufacturing plants at

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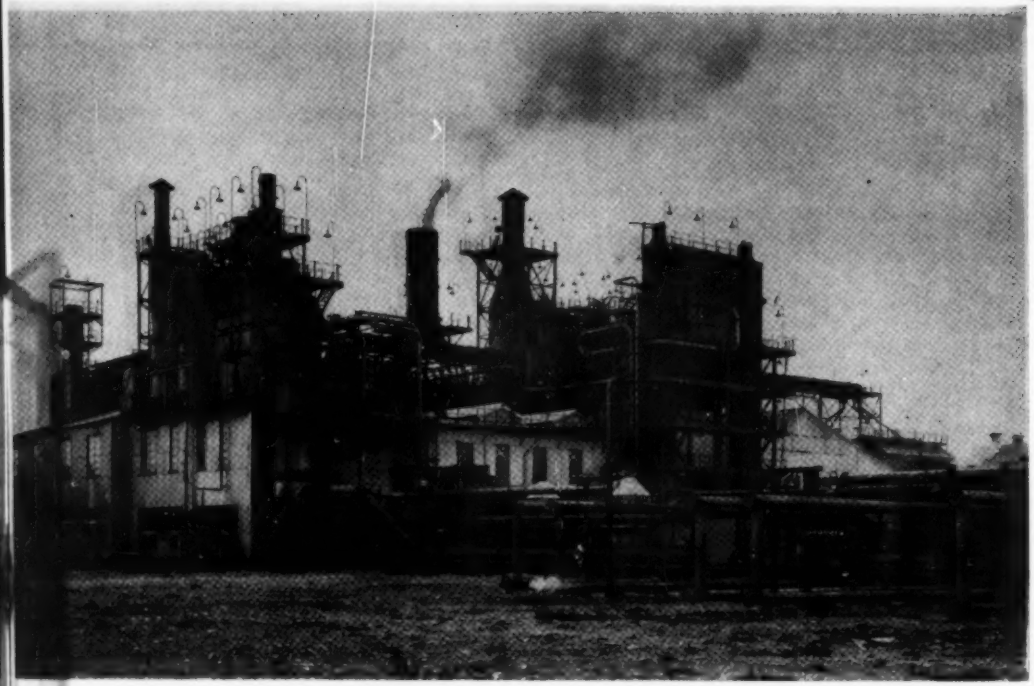


General view of Philblack, Ltd., furnace black plant at Avonmouth, England.

Britain's Philblack Plant Will Produce Fifty Million Pounds Yearly

By E. Lawson Lomax

OFFICIAL opening of the carbon black plant of Philblack Ltd. at Avonmouth took place on October 11. The plant, designed for the annual production of 50 million pounds of carbon black, is noteworthy on account of its size and incidentally for its effect on the dollar-sterling situation as most of this material formerly was imported from the United States.

The plant operates under license from Phillips Petroleum Co. of Bartlesville, Oklahoma, employing processes developed by that company. Royalty will be paid to the Phillips company, but the capital of Philblack Ltd. is wholly British. Main contractor for construction of the works was Head Wrightson Processes Ltd., utilizing designs and technical assistance of the Phillips engineering staff.

Production of carbon black in the Philblack plant is based on the controlled partial combustion of a special petroleum fraction, of which about 70,000 tons yearly is required. At present the raw material is of American origin, but it is hoped that in the near future it will be available from the new and enlarged British refineries.

Pelleting mills in which density of product is increased from 2½ to 23 pounds per cubic foot.

Until about 1928, carbon black was mainly produced from natural gas by the "channel" process, but at that time the more efficient "furnace" process was discovered. World War II gave a strong impetus to the industry, as these blacks were found to be extremely useful as re-inforcing agents in synthetic as well as natural rubber. By the end of the war the furnace process was responsible for the production of about half the carbon black manufactured in the United States.

All this was produced from natural gas, but as the cost of this material has quintupled since before the war, other types of raw material for the manufacture were sought. Phillips Petroleum Company developed a furnace process using oil as a raw material. Development of these oil blacks has been very rapid, and in 1950 accounted for 27 percent of all blacks made in America.

In view of the rising prices of natural gas and the higher percentage yield from oil, it seems probable that in the future there will be a general shift in the source of supply and that the main production of carbon black will be from oil. In any event, this is certain to be the case in Great Britain where supplies of natural gas are not available.

The oil used as a raw material for the process is a carefully selected distillate, boiling at about the gas oil range. This ensures its complete vaporization in the preheater, without leaving any residue in the tubes, such as would be formed if high molecular asphaltenes and resins were present. It should be low in sulfur content and free from moisture. A fairly high aromatic content is an advantage. Some of the products in thermal and catalytic cracking processes conform closely to these requirements; hence the hope that they will be available in the future from the new refineries in Great Britain. In addition, certain coal distillation products, mixed with petroleum products, may eventually become suitable raw materials, provided they are free from ash and suspended carbon, as is the case with petroleum distillates.

Carbon black at the first stage is simply a dense smoke, the solid particles of which are suspended agglomerates of minute size; their collection is one of the major problems of the industry. While a certain amount of smoke is permitted to emerge from the chimneys of most factories, its emission from a "black" factory means a greater or less waste of a valuable product, and so very stringent measures are taken for its practically complete collection.

As first collected it has a bulk density of two-three pounds per cubic foot, in which form its handling for packaging and transport would be difficult and expensive, but fortunately it can be further agglomerated into pellet form, which has a bulk density of about 23 pounds per cubic foot. This pelleting has a further advantage, as carbon black in such a form is more readily mixed with rubber in the blending process than in its original form.

One of the first oil blacks produced by Phillips Petroleum Company is marketed as "Philblack A," now classified as Medium Abrasion Furnace or MAF black. After continued research Phillips produced an even more re-enforcing black which is marketed as "Philblack O." These are trademarked names which are the property of Phillips Chemical Company, a subsidiary of Phillips Petroleum Company.

"Philblack O" imparts to rubber the highest re-enforcing properties, substantially exceeding those obtained with channel black, the previously accepted standard. Hence, this black is used in all applications where the maximum resistance to wear is essential, such as tire treads, belting covers and similar products.

"Philblack A" is a medium re-enforcing black noted for ease of processing. It is used in a very wide range of miscellaneous moulded and extruded rubber products which include, to mention only a few, tire carcasses, cable sheathing, oil seals, rubber boots, soles and heels.

These blacks, primarily designed for the rubber industry, are now finding applications in the manufacture of paint, ink, paper and textiles.

The project at Avonmouth was developed directly from the results of the Phillips research work. It is the largest carbon black plant outside America and produces blacks which are identical with the American Philblacks.

The "Philblack O" unit has a proved capacity of over 30 million pounds and the "Philblack A" unit 20 million pounds per year. These amounts are equivalent to about 50 percent of the United Kingdom's estimated present annual consumption.

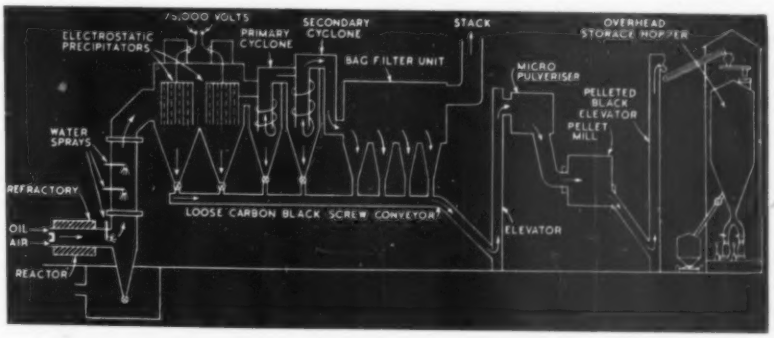
The process oil is delivered direct from tankers through a 14-inch pipe line nearly four miles long to three large storage tanks on the plant site. From the main storage tanks the oil is delivered through transfer pumps to two small day-storage tanks, which afford a ready means of checking oil consumption and provide a constant head of pressure for the individual process oil pumps.

The only other material required for the process is a steady supply of compressed air in large volume. This is provided by three triple-stage direct-coupled air blowers, each powered by a 550 hp motor.

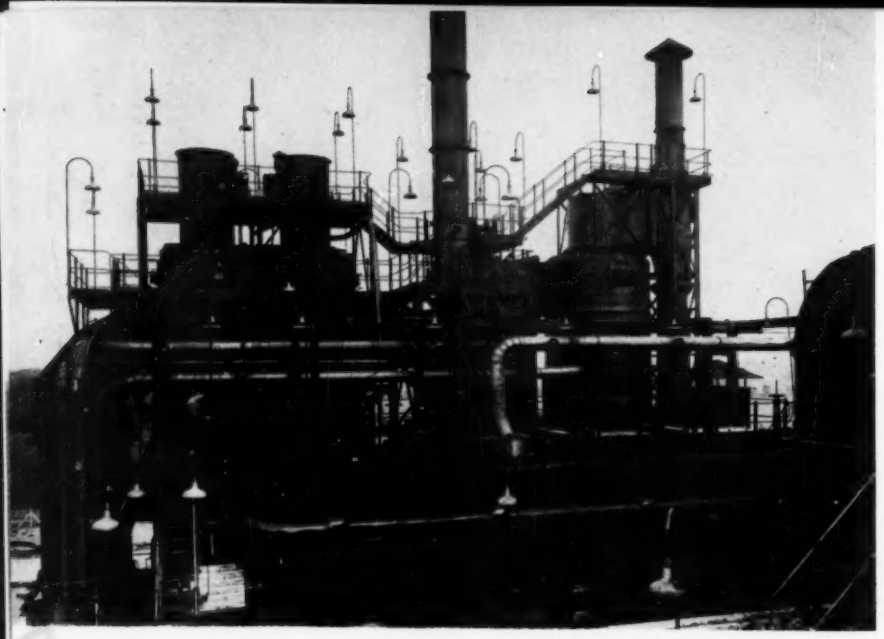
As mentioned earlier, the process of production is based on the controlled partial combustion of a special petroleum fraction supported by a limited supply of air, both these materials being continuously fed into specially designed reactor furnaces. The degree of combustion which takes place generates sufficient heat in the reactor to decompose that portion of the oil which is not burned. Carbon black, gaseous-by-products and water vapor are formed in the reaction.

The temperature within the reactor is controlled by the air-oil rates, flow turbulence, and the extent of combustion permitted, all of which have a very decided influence, together with reactor design, on the quality and quantity of black produced.

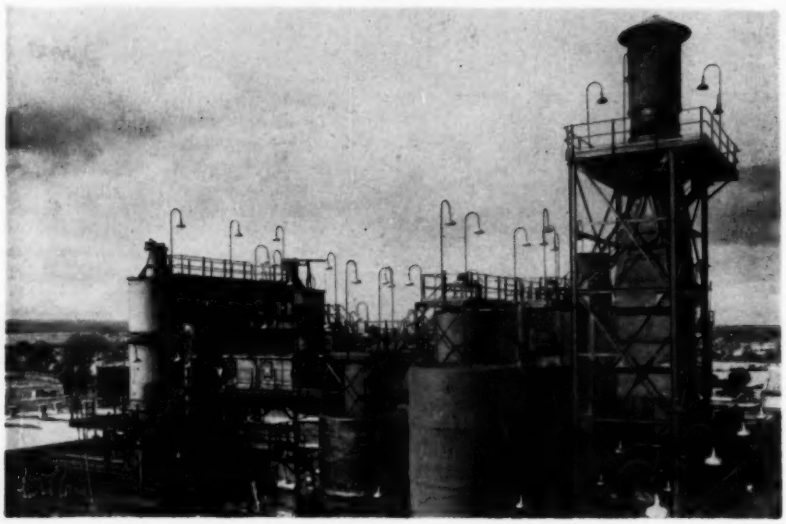
The process oil is fed by an individual proportionator pump to a tubular oil-fired preheater in which it is vaporized and then passes into the reactor. At this stage a controlled supply of air, direct from the compressors, is admitted. The reactor, which is of special design, consists of a horizontal steel cylindrical shell lined internally with high refractory bricks to withstand the very high temperature generated in the reaction. On emerging from the reactor, the products of combustion are partially cooled in a vertical pipe fitted with water sprays. From there they pass through an atmospheric cooling pipe and then enter the main smoke



Flow diagram of Avonmouth Philblack plant.



Philblack "A" recovery unit. From left to right: secondary quench tower, precipitator and cyclones. In the foreground are bag filter units discharging to the final stack in the center.



Philblack "O" recovery unit. From left to right: twin secondary quench towers, precipitator, triple sets of primary and secondary cyclones, intermediate stack.

header pipe, where the products from all the reactors in the plant enter and commingle.

The mixed products of combustion then pass up a vertical cylindrical cooling tower which is fitted with open water sprays, in which the gases are cooled to the temperature required at the inlet to the Lodge-Cottrell type precipitator. Here the carbon-laden gases are induced to flow through an electro-static field of 75,000 volts, the main function of which is to agglomerate the very fine particles of black into small clusters. During this process, 20 to 30 percent of the carbon black yield falls to the base of the precipitator. In order to obviate collection of the carbon black on the electrodes, they are fitted with a tapping device which causes the accumulated black to fall off before the accumulations get large enough to cause trouble. The gases now pass through primary and secondary cyclones of conventional design where a further 75 percent of the carbon black is deposited by mild cyclonic or centrifugal action. In these two steps, up to 95 percent of the carbon yield is separated and collected. The gases now contain only about five percent of the black yield. The emission of a smoke of this density would be tolerated from an ordinary factory, but in the case of the Philblack plant, where maximum yields are the object and where atmospheric pollution also is to be avoided, this remaining five percent must be as completely extracted as possible. The gases therefore are now passed through the bag filter plant. This plant consists of a number of bag filters which are made of glass cloth stretched over light steel box frames to prevent collapse. The gases are drawn through these filters, which work in parallel, the individual units being by-passed in rotation for removal of accumulated carbon and are cleaned by blowing a current of clean gas through them in the reverse direction. At the present time the filtered gases are exhausted to atmosphere, but as they have a calorific of over 60 btu. per cubic foot, arrangements are to be made to utilize them as fuel in the plant.

The carbon black obtained from the precipitators, the cyclones and bag filters is collected in a stainless steel screw conveyor and passed through the micro-pulverizers to the pellet mills. These micro-pulverizers are conventional type hammer mills, and are used to ensure that any hard particles which may be present are reduced to the finest possible powder form. At this stage the black is in an extremely fluffy state, with a density of approximately 2½ pounds per cubic foot.

As mentioned before, the packaging and transport of the black in this physical condition would not be very satisfactory for many reasons, such as high costs of containers against weight of material transported, high handling losses and also the difficulty of maintaining reasonably clean working conditions. Fortunately, however, the material can be pelleted and its bulk density raised to about 23 pounds per cubic foot, in which form it is practically dust free. In the pelleted form it has been found that it is more readily incorporated into the rubber during the mixing operation than when in the light powder form.

The pelleting mills consist of long steel cylindrical revolving drums through which the fluffy black flows. During this treatment the small particles agglomerate, while air and gases are liberated, and the agglomerated particles are rolled into small pellets which can be easily handled for packing and transport. The pellets leaving the mill are picked up by an elevator from which they are delivered to the storage hoppers. From the storage hoppers the black is fed by gravity either to the bag filling plant or to bulk containers.

Auxiliary equipment includes a water-pumping and permutit softening plant, together with a cooling system; two automatically-operated steam boilers; a mechanics' shop and stores; two electrical sub-stations and a DC operated inert gas generating system for purging purposes.

Bathing facilities are provided for the use of the employees in a specially designed and up-to-date bath house. Each employee is provided with two lockers, one for clean and one for dirty clothes, and also with complete sets of underclothes which are laundered for him by the company. When an employee starts work on his shift, he leaves his own personal clothes in his clean locker, and then puts on the underclothes, boiler suit and boots provided for him. On finishing his shift, he discards the clothes he has been wearing for his work, which then go for laundering, has his bath and then goes to his clean locker, where he picks up his clean underclothes and puts them on prior to completing his dressing in his personal out-door clothes. A canteen is provided on the works and is open and available throughout the 24 hours of the day.

Anglo-Iranian Oil Company's 1950 Report Shows Record Operations and Earnings

THE forty-second annual report of Anglo-Iranian Oil Co. Ltd. covering operations for the year 1950 was presented at the general meeting of the company held in London on December 20. Submission of the report was delayed beyond the usual date by developments in Iran earlier in the year which led to the virtual expulsion of the company from the area which had been the seat of its principal activities over the past forty years.

The report has attracted unusual interest not only because of these events, but by reason of the fact that 1950 was marked by a great increase in the volume of business and by the highest earnings in the company's history. Sales of crude oil and products increased by 26 percent over 1949 while average prices were about 20 percent higher. Combination of these two favorable factors resulted in a trading profit of £81,300,622 ($227,641,742) as compared with £38,666,485 ($108,266,158) in 1949. Consolidated profit and loss accounts for the two years are compared in Table I.

The consolidated balance sheet of Anglo-Iranian Oil Co. Ltd. and subsidiary companies as of December 31, 1950 shows current assets of £268,494,420, current liabilities £76,145,614 and reserves and undistributed profits £68,564,138.

While there has been a general impression, arising presumably from the company's name, that its operations were dependent wholly on Iranian oil, the report shows that in 1950, although the crude output of Iran was 31,750,000 tons, highest in the country's history, the company's production from its operations in other areas was over 9,000,000 tons—or more than 20 percent of the total. During 1951, production from these outside areas has greatly increased and is expected to supply the company with 27 million tons or more during the coming year. At the present time an active program of exploration and drilling is being pushed in various parts of the world to increase the supply of crude needed to meet expanding demands.

A major part of the earnings of Anglo-Iranian is derived from operations entirely outside of Iran, including its 13 refineries located in the United Kingdom, France, Belgium, Germany, Italy, the Near East and Australia; from its large tanker fleet aggregating 1,800,000 deadweight tons in 1950 and since substantially enlarged; and from its score of marketing companies operating throughout the eastern hemisphere.

The report reviews the chief events in the attack upon the company by the Mossadegh administration during the past year which led to the final withdrawal of the company and all its non-native employees in October last. In this connection, the report refers back to the agreement adopted in 1933 and quotes the several articles in this convention containing assurances that it would not be abrogated by unilateral action, including Article 26 which stipulated that, until the termination of the contract in 1993, it would come to an end "only in the case that the Company should surrender the concession . . . or in the case that the arbitration court (the Court of International Justice at The Hague) should declare the concession annulled as a consequence of default of the Company in the performance of the present agreement."

"It was in virtue of these unequivocal undertakings on the part of the Iranian government neither to annul the Convention nor to alter its terms by unilateral action," continues the report, "that the company embarked upon and maintained development work in Iran on such a large scale. It must be remembered that in the early struggling years of the company's history, great risks were taken without reward of any sort from the investment. From 1933 onwards a number of important new oilfields were discovered and brought to the production stage with the result that between 1933 and 1950 the company's annual production of oil in Iran rose over fourfold. To sustain this production the company carried out a similar expansion, in face of strong competition, of its world-wide distributing and marketing organization, without which Iran's oil industry could never have approached its present status as a major national asset and fruitful source of revenue and employment. Furthermore, in order to cope with the striking increase in the output of oil, the company made very extensive additions to the pipe line system and to the refinery at Abadan and its ancillary services. It likewise carried out a vast expansion of the social services for its tens of thousands of employees in Iran, 94 percent Iranian nationals, whose numbers had been greatly increased. In consequence of the very large extensions to the Abadan refinery, it became a most up-to-date refining unit with the largest throughput in the world."

The initiation of new negotiations in 1948 with the purpose of providing a larger participation by the Iranian government in the earnings of the company, the acceptance of

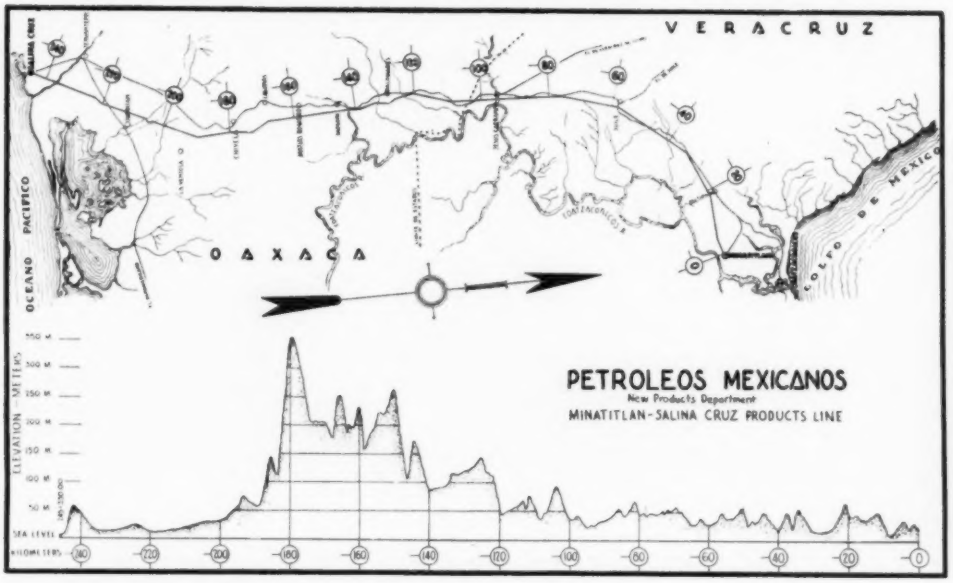
(Please turn to page 60)

TABLE I

Profit and Loss Account

	1949	1950	
Trading profit	£38,666,485		£81,300,622
After charging Royalty and Provision for Special Contingencies including:[1]			
Land, oil wells, pipe lines, refineries, tank installations and building	£10,359,953	£12,327,530	
Tankers and auxiliary vessels	7,263,263	7,668,587	
Allied companies and trade investments	150,000	150,000	
	17,773,216	20,146,117	
Written off exploration interests	5,580,704	11,299,255	
Provision for Survey Repairs	1,000,000	2,750,000	
Dividends from subsidiary companies	925,205	950,223	
Dividends and interest from allied companies	1,253,207	2,018,563	
Interest on Securities	439,493	196,934	
	2,617,905		3,165,720
	41,284,390		84,466,342
Deduct United Kingdom profits and income taxes	22,840,181		50,706,880
Net Profit for Year:	18,444,209		33,759,462
Less accounts retained by subsidiary companies and profits of minority shareholders	54,193		656,890
	18,390,016		33,102,572
Appropriations to reserves	11,000,000		26,000,000
	7,390,016		7,102,572
Balance, brought forward from previous year	1,608,438		1,885,970
	8,998,454		8,988,542
Dividends paid	7,112,484		7,112,484
Balance carried forward	1,885,970		1,876,058
Plus balances of subsidiary companies	666,701		1,120,231
Balance on Profit and Loss Accounts	2,552,671		2,996,289

[1]Trading profit after charging Royalty amounting to £16,031,735 and crediting Special Contingencies account with £16,500,000.



Map of new trans-isthmus products line with elevation profile to show rugged terrain traversed.

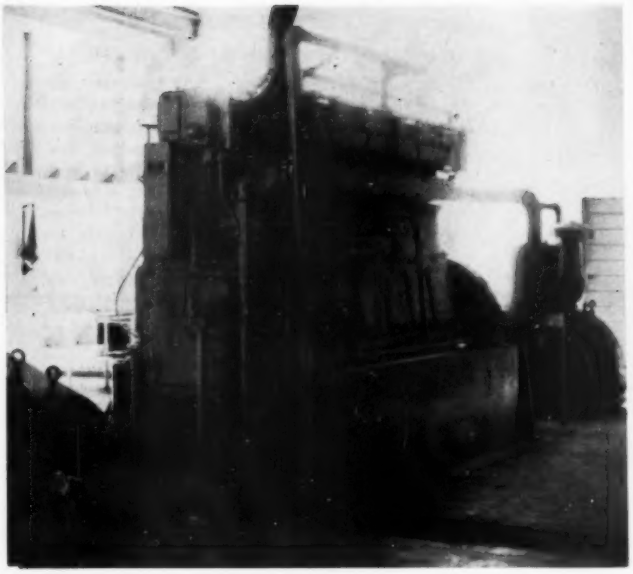
Products Line Spans Mexican Isthmus

By B. Mascanzoni
Engineer, Petroleos Mexicanos.

Salina Cruz terminal at Pacific Coast end of Pemex line.

LOCATION of all of Mexico's oil-producing zones in areas near the Gulf of Mexico has brought about a situation whereby all of this country's production, transportation and refining installations are concentrated in that part of the country. This trend has been further accentuated by the fact that during the epoch when foreign oil companies operated in the country, the main goal of their policy was exportation. As a result, the Gulf ports closest to the producing fields were the logical points for their activities.

Expropriation of the oil industry ushered in a radical change of policy, tending to give preference to supplying and broadening of the domestic market. Construction of the 18 de Marzo refinery in Mexico City and the Antonio M. Amor refinery in Salamanca in the State of Guanajuato, together with their respective pipe lines, contributed largely toward solution of the problems of supply and distribution of oil products through the central part of the country. However, the Pacific Coast region farthest from the oil-producing centers continued to present a difficult supply problem. Products had to be shipped by rail across the Isthmus of Tehuantepec for later distribution by tankers from Salina Cruz to various Pacific Coast ports. The limitation of this method rested basically upon the inability of the railroads to move the volume of fuel required with speed and efficiency, as well as upon the high cost involved in this type of transportation. This handicap was combatted by importing gasoline and diesel oil for the Pacific Coast in exchange for crude exported from the Gulf Coast. But it was clear that a definitive solution of the problem obviously called for construction of a trans-isthmus pipe line. This



Cooper-Bessemer diesel employed to drive pumps at Minatitlan station.

Only one pump station now is operating to pump 15,000 b/d of products.

project, conceived a number of years ago, has finally become a reality.

The pipe line was designed primarily to transport finished products such as gasoline, kerosine and gas oil until refineries planned for the West Coast have been built. Afterwards, when the projected Pacific refineries are completed, the line will supply crude to these plants.

Selection of the pipe line route was the object of careful study. The shortest route, which approximated a straight line between the two terminals, had to be discarded because of construction difficulties and high cost involved. Routes that merely followed the railroad or highway would have demanded excessive extension of the line with consequent increase in cost. The route finally chosen was based upon minimum construction expense compatible with available facilities necessary for the line's operation and maintenance.

Building of the pipe line brought up various construction problems owing to topographical conditions and the different types of terrain that had to be crossed, such as areas full of broken rock and others with luxuriant foliage. Local climatic conditions also required a rapid working pace if the job was to be finished before arrival of the rainy season, which would have interrupted the project.

The pipe line is the first built in this country for the transportation of finished products. Its management is much more delicate than that of an ordinary pipe line for transporting crude. Necessity for moving a series of different products consecutively through the same pipe presented a number of problems, owing to contamination between different products. Control of this contamination, within limits that do not alter the quality of the transported products, is one of the most important aspects in the operation.

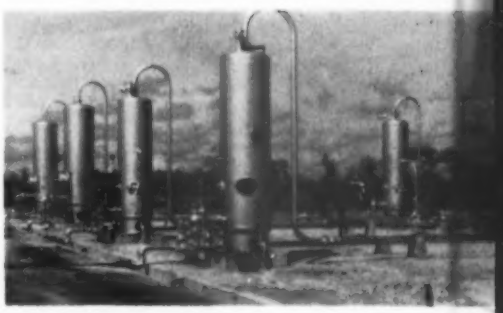
The length of the line, which extends from Minatitlan to Salina Cruz, is 245 kilometers. It is constructed of steel pipe $10\frac{3}{4}$ inches in outside diameter and with walls .261 inch thick, protected along its entire length by an anti-corrosive wrapping composed of glass-fiber cloth rolled spirally and covered by enamel laid on a base of $\frac{1}{8}$ inch tarred cloth.

Current operation of the pipe line is being carried on by a single pumping station at Minatitlan. This station is equipped with two Wilson-Snyder reciprocating pumps of 15,000-barrel-a-day capacity each, one operating and the other kept for emergencies. These are powered by a 325 hp Cooper-Bessemer diesel engine. Pumping pressure varies from 600 to 800 psi, depending upon the kind of products pumped at a given moment through the line.

In the case of future operation, when crude will be transported, another pumping station similar to that in Minatitlan will be installed approximately at the line's halfway point. Eventually, the transport capacity for crude is expected to reach 30,000 barrels per day.

The present Salina Cruz terminal for storage of oil products and tanker cargoes is being enlarged to adapt it to the new conditions demanded by its function as a pipe line terminal.

Total investment in this pipe line has been about 25,000,000 pesos, but when it operates at maximum capacity it is calculated it will represent a monthly saving of more than 1,000,000 pesos in transport costs and, what is more important, will vastly improve the supply of fuel to large and important sections of Western Mexico.



High pressure field gas separators near Salamanca.

Geology of the Williston Basin in North Dakota

By Wilson M. Laird

State Geologist, North Dakota Geological Survey, University of North Dakota.

THE Williston Basin has been of some interest from an oil standpoint for a number of years. The earliest known study of the geology of North Dakota from the standpoint of oil and gas goes back some 25 or 30 years. However, up to April of last year very little encouragement in the form of actual production was given to oil prospecting in the state.

On April 4, 1951, Amerada Petroleum Corp. brought in its initial discovery well, the Clarence Iverson No. 1, located in the center of the SW SW Sec. 6, T. 155N., R. 95W., in Williams County. This well also had another show of oil higher in the section which was reported in the press in January of 1951. It was not until April 4 however, that a somewhat deeper horizon was tested. This horizon encountered oil with a great deal of gas at 11,630 to 11,660. The initial production of this well was around 307 barrels of 53.2 gravity oil, 25 barrels of mud and water in 17 hours through a ¾-inch adjustable choke accompanied by 3,100,000 cubic feet of gas. The gas-oil ratio was 8,635 to 1.

Amerada wished to drill deeper to obtain additional geologic information, so this horizon was mudded off and the drilling continued to a total depth of 11,955 when mechanical difficulties interfered with further deepening. The well was then plugged back to a depth of 10,540. It was perforated from 10,490 to 10,530 and the oil-bearing zone which had been reported in January, 1951, was put on production. This horizon produces a 39.8 gravity crude at the rate of 290 barrels a day. The crude has a high wax content and a high pour point. The gas-oil ratio on the horizon from 11,630 to 11,660 was up to as much as 8,635 to 1, but the gas oil ratio in the zone which is in production at the present time is about 500-1,000 to 1. The well has now been plugged back to the Madison formation and is being perforated and worked over at the present time. At this writing the well has not yet produced from the Madison.

As a result of this discovery, leasing was intensified in the state and further drilling operations were started, mainly by Amerada. The company next started drilling the Henry O. Bakken No. 1, located in the center of the SW NW Sec. 12, T. 157N., R. 95W., Williams County, (No. 32 in Fig. 1). This well on Sept. 7 encountered a substantial quantity of 40° gravity oil with a gas-oil ratio of 700-800 to 1 in the Madison from 8,304 to 8,360 ft. although the amount of oil was not stated by the company. It was said, however, that a substantial amount of oil was recovered. Drilling on deeper, salt water was encountered at 8,361 to 8,394. The well is still drilling and no more recent data have been released.

Amerada also has located a well known as SW SE ¼ of Sec. 12, T. 149N., R. 96W., in the Benhomer Risser No. 1, located in the McKenzie County, (No. 33 in Fig. 1). This

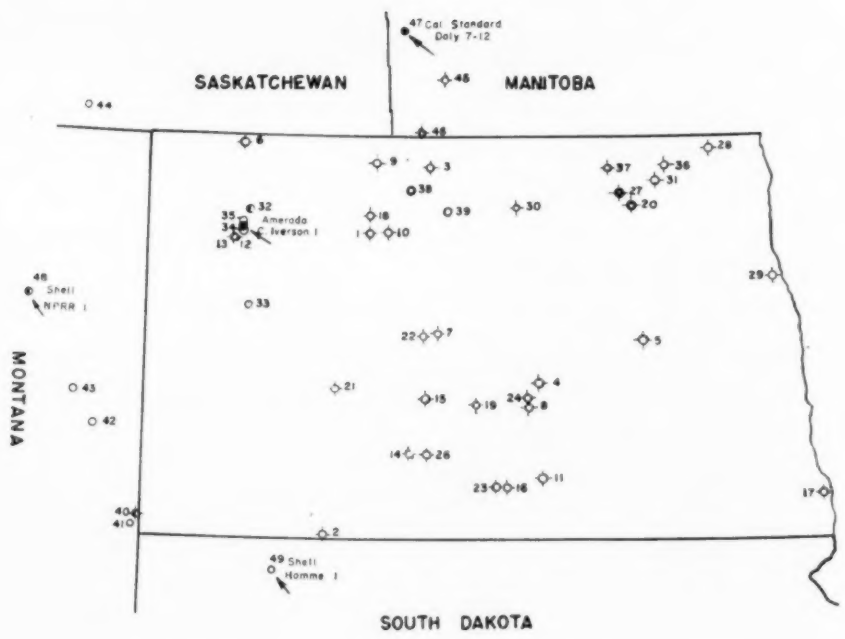


Fig. 1. Diagrammatic map showing location of important oil tests in North Dakota and surrounding areas. (See tabulation on page 48.)

Part of 58,000 square miles of new photo coverage of the Williston Basin area made recently by Aero Service Corp., Philadelphia. This photo covers an area not far from Glasgow, Montana.

well is drilling ahead, and inasmuch as it is farther toward the center of the Williston Basin, the sediments encountered in this well would be expected to be thicker.

Amerada's fourth venture is the Palmer Dilland No. 1, located in the center of SW NE Sec. 31, T. 136N., R. 95W., Williams County, (No. 35 in Fig. 1). This latter location is a little over a mile north of the discovery well. Testing has been going on in this well in several horizons and on Oct. 10, 1951, it was announced that on a four-hour drill stem test from 8,396-8,444, 40° gravity oil at the rate of 50 barrels per hour had been recovered.

Union Oil Co. has been carrying on a drilling campaign and has completed five dry holes in Cavalier and Ramsey Counties. These wells are as follows: Aanstad No. 1 stratigraphic test, located in the NE ¼ of Sec. 29, T. 158N., R. 62W., Ramsey County (No. 20 in Fig. 1); Chris Skjervheim No. 1, located in the center of NW NE Sec. 28, T. 159N., R. 63W., Cavalier County (No. 27 in Fig. 1); Lillian Wohletz No. 1, located in the center of NW SW Sec. 32, T. 160N., R. 60W., Cavalier County (No. 31 in Fig. 1); Union Central Life Insurance Co.-Ellis No. 1, located in Sec. 12, T. 161N., R. 60W., Cavalier County (No. 36 in. Fig. 1); and Restad No. 1, located in Sec. 26, T. 162N., R. 64W., Cavalier County (No. 37 in Fig. 1).

Tioga Petroleum Co. is drilling the Math Iverson No. 1, located in the center of the NE NW Sec. 18, T. 155N., R. 95W. (No. 34 in Fig. 1). At a depth of 8,360-8,500 this well produced at a rate of 40 barrels per hour. A second drill stem test from 8,500-8,530 made gas, salt water and mud.

In the adjacent state of Montana a number of interesting tests are going down. One of these particularly is of considerable interest in view of the fact that it has found oil in the Madison. These wells are the Shell Oil Co. No. 1, Fee (Pine Unit), located in the SW of SW NE Sec. 30, T. 12N., R. 57E, Wibaux County, Montana (No. 42 in Fig. 1); the Shell Oil Co. N.P.R.R., SE NW NW Sec. 19, T. 23N., 50E., Dawson County, Montana; the Texas Co. No. 1, N.P.R.R., center of the NE NE NE Sec. 35, T. 15N., R15E., Dawson County, Montana (No. 43 in Fig 1); and the Texas Pacific Oil and Gas and the Pure Oil Co's. No. 1 Cox located in Sec. 23, T. 3N., R. 61E., Fallon County, Montana (No. 41 in Fig. 1).

Shell Oil Co's. No. 1, N.P.R.R., located in SE of NW NW Sec. 19, T. 23N., R. 50E., Dawson County, Montana, is known as the Richey well and recovered considerable quantities of high gravity oil in a 40-minute drill stem test between 7,138 and 7,253 in the Madison or in the Charles. This oil was of great interest because it was high quality and large quantity. The well was reported to be able to produce as much as 4,000 barrels a day on a drill stem test. However, this has not been substantiated by the operator, and it would appear that the well is capable of producing somewhat less than was originally reported. On a drill stem test of 8,577-8,658 in the Devonian, muddy salt water, carbon dioxide cut, was recovered. This well was drilled to a total depth of 10,518 before being plugged back to the Mississippian and completed at 7,275 feet.

The Texas Co. and Shell Oil Co. recovered 360 feet of watery mud on a 90-minute drill stem test from 7,572 to 7,692, probably in the Madison, in their No. 1 Northern Pacific located in the center of the NE NE 35, T. 15 N., R. 54E., Dawson County, Montana.

In the Shell Oil Co's. No. 1 Fee (Pine Unit) located in the SW SE NE Sec. 30, T. 12N., R. 57E., Wibaux County, Montana, the drill stem test was run in the Mission Canyon between 7,512 and 7,607. The recovery was 1,350 feet of slightly oil and gas cut mud and 990 feet of oil and gas cut water, with 1,920 feet of slightly gassy water with a trace of oil. Another drill stem test was run from 8,924 to 8,975 in the Madison. The tool was open 55 minutes and four barrels of 29 gravity oil were recovered. This well is also drilling ahead.

In South Dakota the Shell Oil Co's. No. 1 Homme located in the center of the NW SE Sec. 13, T. 20N., R. 12E., in Perkins County, South Dakota, has recovered a small show of oil from the Madison and is now being abandoned in the granite at total depth of 9,348.

In the adjacent province of Manitoba, Canada, more interest is present as far as Madison production is concerned. During 1949 and up to July 1951, 24 wells have been drilled or are drilling of which three have encountered oil. These three are the California Standard's 15-18 Daly, 10-18 Daly, and 7-12 Daly. These wells are producing relatively small amounts of high gravity crude from the Madison at a depth of 2,200 to 2,340 feet. In general these wells are running about eight to ten barrels a day. The oil has a gravity in excess of 30° API.

In Saskatchewan, Shell is drilling a well known as the Dahinda No. 1, located about 50 miles southwest of Regina (No. 44 in Fig. 1). It has recovered 20° gravity crude from the Mississippian dolomite at a depth of 4,694 to 4,704. Initial bailing tests gave oil at the rate of 25 barrels daily with no water, after which a thousand gallon acid treatment was applied. At the time of the last report, acid water and drilling fluid were still being returned with the oil, and it is yet not possible to determine the potential nor establish whether or not the well has been cleaned out.

All of these tests are interesting not only for the fact that they found oil, but also that they are widely scattered in the Williston Basin. The Shell wells are located in Montana, South Dakota, and in Saskatchewan. The California Standard and other wells are located in the province of Manitoba, and the Bakken and Dilland wells are in North Dakota. All of these wells are capable of producing oil from the Madison. Furthermore, several other tests in North Dakota have indicated shows of oil in this particular horizon, indicating that the Madison is a very fine potential oil rock; and inasmuch as it occurs over about two-thirds of North Dakota, it is extremely interesting to the oil prospector.

The production from the Devonian in the Amerada discovery is encouraging and most of the tests which are now drilling will be projected to that depth and beyond to see what the possibilities are. All in all, the oil picture as far as North Dakota is concerned, since much of the Williston Basin is within its boundaries, is highly encouraging.

Structure of the Williston Basin: The Williston Basin is simply a basin on a large shelf east of the Rockies and west of the pre-Cambrian shield area in Canada and Minnesota. This basin is one of several such basins in this general area which have been downsinking much of the post-Pre-Cambrian time. The actual center of the basin probably varied a little from place to place as is indicated upon the isopach maps of the various periods. However, in general its location has been much the same since the end of pre-Cambrian time to the present.

Within this basin are a number of structures. The westernmost limit of the basin in southwestern North Dakota is the Cedar Creek anticline. In the central part of the basin, just east of Williston and at the pres-

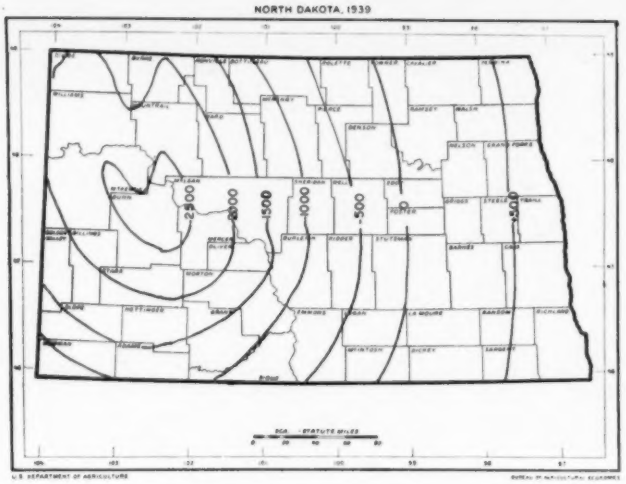


Fig. 2. Structure map with elevations on the Dakota sandstone.

ent site of the producing wells, is the famous Nesson anticline. The Nesson anticline is a surface structure extending roughly in a north-south direction. However, the subsurface picture may be somewhat different, and it is not unlikely that there the structure may tend more in a northwest-southeast direction.

In addition to the Nesson, there are other fairly well-known structures in the state. Two near Linton in Emmons County, North Dakota, have been penetrated by two wells, namely the Northern Ordnance Franklin Investment No. 1, (No. 16 in Fig. 1) and the Roesser and Pendleton J. J. Weber No. 1 (No. 23 in Fig. 1).[1] These structures differ more others in the state in that their trend is more or less east-west.

Some interesting speculations as to the origin of these east-west or northeast-southwest structures can be made, but little positive data is available. A glance at either the geologic map or the tectonic map of the United States will show that the strike of Pre-Cambrian rocks in Minnesota is definitely northeast-southwest. It does not require much imagination to extend these trends under the younger rocks into the subsurface in North Dakota. Further suggestions that the Pre-Cambrian bedrock in North Dakota may have such a trend is found in magnetic maps of Rolette and Towner Counties made by N. N. Kohanowski of the North Dakota Geological Survey.[2] Here too, the magnetic anomalies tend in a northeast-southwest direction.

In Minnesota these folds are the result of late Pre-Cambrian folding which undoubtedly affected the North Dakota area as well. These folds must have been base levelled in Pre-Ordovician time, and the Ordovician sea undoubtedly advanced over this old-land area. Some of the erosion remnants may have extended some distance above the general level and thus may be the "core" over which later sediments were deposited. Thus, some of these east-west and northeast-southwest folds may be due to Pre-Cambrian highs. Therefore, a magnetic study of the eastern half of the state, where the sediments are thinner and where such structure might be more easily detected by a magnetometer, might be a profitable venture. Such structures might also show up by seismic prospecting.

It should be emphasized that this foregoing hypothesis is based on very insufficient evidence and should be used only as a possible guide to exploratory thinking.

However, other smaller structures in Emmons County parallel at least in general direction the trend of the Cedar Creek anticline. This is true of other structures known in the state, especially those in the southern part of Morton County, North Dakota.[3]

Among the structures which might conceivably be found are those of the fault type. Several fault type structures are questionably identified in the state although their exact origin is not entirely clear. In Kidder County, near Horsehead Lake, is a range of hills in which the dip of the beds, of either Fox Hills or Cannonball age, is about 45° to the north and east. This is, of course, directly opposite from the regional dip. It has been suggested that possibly these beds may conceivably be due to ice shove, although it seems unlikely that a disturbance of this magnitude might have occurred in this area.

About seven miles north of Carberry in Bottineau County on the west side of the Turtle Mountains is an area of disturbed rocks of the Fort Union. These, apparently, are due to the ice shove or landslide.

Recently Townsend[4] indicated a small structural disturbance in the northwestern part of the state near Lignite in central Burke County. He has indicated that these structures so noted are due to structural deformation. It would appear, however, quite likely that the structures may be due either to ice shove or landslide. The exact nature of this

[1] See Fisher, S. P., *Geology of Emmons County, N. D.*; N. D. Geol. Survey, Rept. Invest. No. 5 Plate II, 1951.

[2] Kohanowski, N. N., *Magnetic Map of Rolette and Towner Counties and Adjacent Areas:* N. D. Geol. Survey Rept. Invest. No. 6, Plate I, in press.

[3] See Laird, W. M., Mitchell, R. H., *The Geology of the Southern Part of Morton County*, N. D., Plate 2, 1942.

[4] Townsend, R. C., *Deformation of Fort Union Formation Near Lignite, North Dakota*, Am. Assoc. Petroleum Geol. Bull., Vol. 34, pp. 1552-1564, 1950.

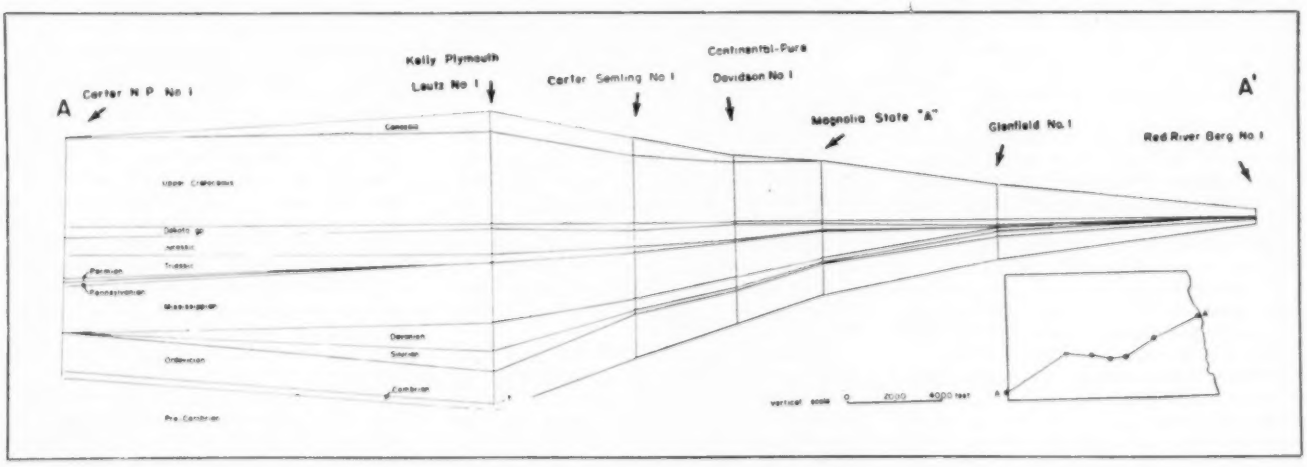


Fig. 3. Geologic cross-section of North Dakota.

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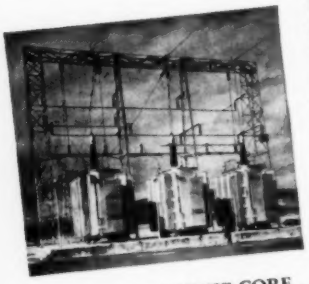

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deformation must await further detailed work. It is not thought by the author at the present time that these are true orogenic disturbances.

The origin of these structures, particularly the anticlines, is still a matter of conjecture. The parallelism of the major portion of the anticlines with the Cedar Creek anticline would suggest an orogenic fold of some kind. It seems hard, however, to imagine that these structures would be due to compression by horizontally-directed forces through such incompetent beds as those of the Cretaceous and the overlying Cenozoic beds.

It is possible that some of these beds may be due to compaction of beds over hard cores at depth. More possibly, they might be due to compaction over reefs which are known to be present in the Devonian. This is something which would be difficult to prove at present, and it is hard to see how such compaction features would show through such a large unconformity as is apparently present at the base of the Triassic and Jurassic in North Dakota.

One hypothesis which should be given consideration but which has not been discussed much in the literature is the fact that some of these folds may be due to deep-seated faulting. It will be noted on the Cedar Creek anticline that the western side of this anticline is by far the steeper of the two sides. There is considerable question as to whether or not this might be due to faulting at depth and some geologists would suggest that on the northern end of this anticline on the western side, faulting actually extends to the surface. It is suggested, therefore, that some of these anticlines that are found in North Dakota may be due to deep-seated faulting, probably in the basement rock.

If the folds are due to deep-seated, high angle type faulting, there would be less necessity for the folds to be closely aligned. There might be cross folds at angles to the general structural trend of the Cedar Creek anticline. This cross faulting to the general trend is suggested by the questionable fault structure in Kidder County near Horsehead Lake and by the east-west trending anticlines in Emmons County.[5] The Keene Dome of the Nesson anticline in McKenzie County suggests a split axis.[6] If this fold were due to deep-seated faulting, the split axis might be due to a cross fault.

As to the age of the structures, about all that can be said is that they are post-Paleocene inasmuch as the rocks of the Paleocene age are known to be disturbed.

There are two main kinds of traps to be considered in North Dakota. These are structural and stratigraphic. Inasmuch as the structural type traps have been discussed in the foregoing paragraphs, they will not be described here.

The stratigraphic types of traps, however, deserve considerable discussion in view of the fact that they probably will be as important as the anticlinal type, if not more important.

The most important type of stratigraphic accumulation will be that of the unconformity. A number of unconformities are known in North Dakota, but probably the most important, at least at the present time, is that at the base of the Triassic-Jurassic. It can be noted by referring to the cross-section in Fig. 3 that the Triassic and then the Jurassic overlap beds of all ages from Permian down to the Ordovician and possibly even lower. The most important part of this unconformity is where the Triassic lies directly on top of the Mississipian. At this point, or very near to it, a considerable zone of porosity has been developed near or in the top of the Madison, with the result that a sizable reservoir unquestionably could be developed at this point in the section. Furthermore, in Manitoba several wells have been completed in the Madison in this type of geologic situation.

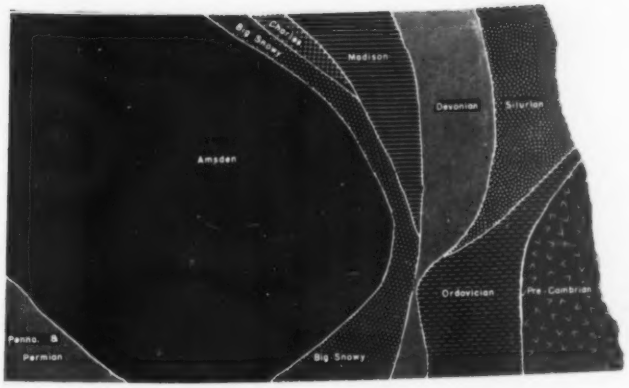

Fig. 4. Pre-Triassic-Jurassic paleogeologic map.

Other unconformities are known; probably the next most important one would be at the base of the Kibbey, which is the true base of the Big Snowy group. It would appear that the Big Snowy group transgresses extensively the Madison limestone, especially in the south-central part of the state.

The Devonian apparently rests with pronounced unconformity on beds of Silurian and Ordovician age. There is, of course, some question as to the extent of the overlap of these various unconformities due to the fact that we have so little data, particularly in the eastern part of the state where the unconformities are most pronounced.

Another type of stratigraphic occurrence which may be of interest from the standpoint of oil accumulation is the wedge-out. It will be indicated later in this article that paleogeographic conditions during much of the Paleozoic were as follows: a large but rather low land mass to the north, east and perhaps in some period to the southeast from which sediments were being washed and subsequently deposited on the shelf-like area and in the Williston Basin to the west. The extent of this land mass area, which probably could be called Siouxia, was not the same in every period. Therefore, we find that the beds wedge out up dip toward the eastern side of the basin. Furthermore, since this land mass during the Devonian, and possibly also the Silurian, extended across South Dakota into Wyoming and southeastern Montana, it is not impossible that in southwestern and south-central North Dakota the Devonian and Silurian wedges out in that direction.

The possibility of reef occurrences has been alluded to earlier in this report. Reefs are known both from the Upper Devonian in Alberta and Montana and from the Middle Devonian of Manitoba. Possible reef structures may be present in the Silurian and Ordovician, although less is known of them. Indications of such reef structures are present in several wells drilled in the state.

Other types of possible stratigraphic accumulations which might be considered are the sand stringers. Such sand stringers have been found in the Heath formation and in the Amsden in east-central Montana. Similar beds might also be found in the Muddy sand in the Cretaceous section in North Dakota. In other words the sands of these two particular formations definitely are not blanket sands of the type that might be found in the basal part of the Winnipeg sand formation of the Ordovician.

Potential source rocks: The two main types of source rocks which will probably be found in greatest abundance in North Dakota are the shales and the carbonates. Of these two the shales are more important in the Jurassic and Cretaceous, whereas the carbonates are more important in the Paleozoic.

Of the shales, the potential source rocks which might be mentioned are those of the basal part of the Jurassic section where they are associated with an evaporite sequence. The shales of the Cretaceous, particularly of the Benton group, are well known as being bituminous in nature. Whether or not they would furnish any oil to adjacent sediments, of course, is not known.

The carbonates are found extensively developed in the Ordovician, Silurian, Devonian, Mississippian, and in part of the Jurassic. It seems quite likely that the oil which is found in the Devonian, and probably also in the Mississippian, is indigenous to the carbonate rock in which it is found, in view of the relatively low permeability of most of these rocks. It would seem, therefore, unlikely that this oil had migrated any great distance.

This is the first of a series of two articles by Mr. Laird. The second will appear in an early issue.—Editor.

[5] Fisher, S. P., *Preliminary Maps of the Geology of Emmons County:* N. D. Geol. Survey Rept. Invest. No. 5, Plate II, 1951.

[6] Nevin, C. M. and Laird, W. M., *The Keene Dome Northeast McKenzie County, North Dakota Part I; Subsurface Stratigraphy of the Nesson Anticline Part II;* N. D. Geology Survey Bull. 21, Plate I, 1946.

TABLE I

Dry Holes, Wells and Locations as Shown in Figure 1.

Company and Farm	Location	Elevation (feet)	Total Depth (feet)	Date Completed	Remarks
1. Des Lacs Western Oil Co., No. 1 Blum	SW 4-T, 155N.-R. 85W., Ward County	1,987	3,980	1923	Dry Samples available
2. Davis Well	NW 17-T. 129N.-R. 91W., Adams County	Unknown	2,800	4-27-23	No samples available
3. Great Northern Oil and Gas and Pipeline Co.	S½10-T. 161N.-R. 80W.	Unknown	1,980	.....	No samples available
4. A. C. Townley Interests No. 1 Robinson Patented Land	NW NE 12-T. 142N.-R.72W, Kidder County	1,800	2,400	.....	No samples available
5. Glenfield Oil Co., No. 1	SE 18-T. 146N.-R 62W, Foster County	1,510	3,240		Pre-Cambrian test, partial set of samples available. Dry
6. Northwest Oil Co.	NE 27-T. 163N.-R. 95W, Divide County	Unknown	1,452	.....	No samples available
7. Herman Hanson Oil Syn., No. 1	Sec. 3-T. 146N.-R 80W, McLean County	1,928	1,840	8-18-29	Dry. No samples available
8. Prairie Oil & Gas No. 1 Armstrong	SW SW 2-T. 140N.-R 73W, Kidder County	1,826	3,884	1-15-30	Dry. No samples available
9. A. R. Jones Oil and Operating Co. No. 1 Gehrenger	SE 17-T. 161N.-R. 84 W, Renville County	1,660 (ground)	3,872	1931	Dry. No samples available
10. Velva Petroleum Co.	NW NE 18-T. 155N.-R 83W, Ward County	Unknown	520	3-25-31	Dry. No samples available
11. D. J. Carter No. 1	SE SE 26-T. 134N.-R. 72 W, Logan County	1,964	2,284	1933	Dry. No samples available
12. Big Viking Oil Co., No. 1	SW NE 3-T. 154N.-R. 96W, Williams County	1,870	4,642	1935	Dry. Samples available
13. California Co., No. 1 Nels Kamp	C. NW NE 3-T. 154N.-R. 96 W, Williams County	1,918 (ground)	10,281	8-15-38	Dry. Samples available
14. Carter Oil Co., Stratigraphic Test	NE NW 22-T. 136N.-R. 83 W Morton County	2,219	4,930	10-40	Dry. Samples available
15. Carter Oil Co., No. 1 E. L. Semling	C. SE SE 18-T. 141N.-R. 81 W, Oliver County	2,025	8,850	8-26-42	Dry. Pre-Cambrian test, samples available
16. Northern Ordnance, No. 1 Franklin Investment Co.	C NW NW 35-T. 133N.-R. 75 W, Emmons County	1,909	5,359	7-22-43	Dry. Pre-Cambrian test, samples available
17. H. W. Snowden No. 1, Ruddy Bros.	NW SW 11-T. 132N.-R. 48W, Richland County	955	695	8-19-48	Pre-Cambrian tests, samples available
18. Price Drilling Co., No. 1 J. H. Kline	SE 16-T. 157N.-R. 85W, Ward County	1,679	8,435	11-26-49	Dry. Most samples available
19. Continental-Pure, Davidson No. 1	SW SW SW 6-T. 140N.-R. 77W, Burleigh County	1,909K.B.	6,957	10-15-49	Dry. Pre-Cambrian test, samples available
20. Union Oil Co. No. 1, Aanstad Stratigraphic test	NE 29-T. 158N.-R. 62 W, Ramsey County	1,544K.B.	3,223	11-11-49	Dry. Pre-Cambrian test, no samples available
21. Kelly-Plymouth No. 1 Fritz Leutz	NW NE 28-T. 142N.-R. 89 W, Mercer County	2,284 (ground)	12,526	10-5-50	Dry. Samples available
22. Samedan Oil Corp. No. 1 Vaughn Hanson	NE 10-T. 146N.-R. 81 W, McLean County	1,994K.B.	9,032	10-4-50	Dry. Samples available
23. Roesser-Pendleton No. 1 J. J. Weber	SE 35-T. 133N.-R. 76W, Emmons County	2,012K.B.	5,556	9-19-50	Dry. Pre-Cambrian test, samples available
24. Magnolia Petroleum Co., Dakota A, Stratigraphic Test	NE 36-T. 141N.-R. 73W, Kidder County	1,962 (ground)	5,609	12-21-50	Dry. Pre-Cambrian test, samples available
25. Amerada Petroleum Corp., No. 1 Clarence Iverson	C. SW SW 6-T. 155N.-R. 95 W. Williams County	2,379	11,955	.....	Flowing 290 barrels of oil per day. Still testing as of 11/9/51. Produced oil of 53.9 API gravity from 11,630-11,660 in probable Devonian.
26. Carter-Phillips, No. 1 Dakota	NW¼ 29-T. 136N.-R. 81 W. Morton County	1,991 (ground)	7,790	6-31-51	Dry. Pre-Cambrian test, samples available
27. Union Oil Co., No. 1 Chris Skjervheim	C. NW NE 28-T. 159N.-R. 63W. Cavalier County	1,554 (ground)	3,409	.....	Samples available Jan. 1, 1952. Dry.
28. Turner Oil Co., No. 1 L. G. Gapp	NE SW 7-T. 163N.-R. 55W. Pembina County	Unknown	1,095	.....	Samples available 120-1,095
29. Red River Development and Oil Co., No. 1 Edgar Berg	35-T. 152N.-R. 51 W., Grand Forks County	844	2,051	8-14-51	In Pre-Cambrian at 500 feet. Partial samples available
30. Ajax Oil Corp., No. 1 Bell	NE NE 28-T. 158N.-R. 72 W., Pierce County	1,510	5,383	10-51	Dry. Samples available about April, 1952
31. Union Oil Co., No. 1 Lillian Wohletz	C. NW SW 32-T. 160N.-R. 60W. Cavalier County	1,612K.B.	2,765	8-8-51	Dry. Samples available about Feb. 8, 1952
32. Amerada Petroleum Corp., No. 1 Henry O. Bakken	SW NW 12-T. 157N.-R. 95W. Williams County	....	....	.....	Still drilling as of 11 9/51. Flowed oil in the Madison
33. Amerada Petroleum Corp., No. 1 Benhomer Risser	SW SE 12-T. 149N.-R. 96W. McKenzie County	2,448.6	....	.....	Still drilling

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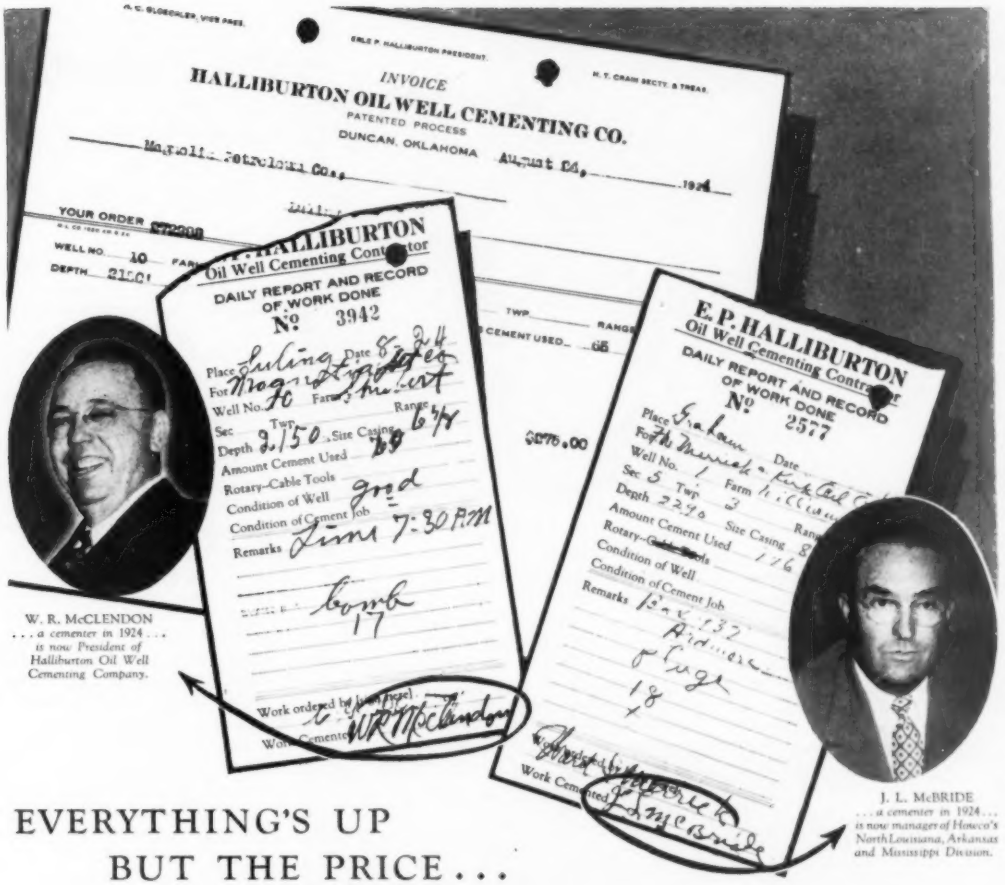


W. R. McCLENDON
. . . a cementer in 1924 . . . is now President of Halliburton Oil Well Cementing Company.

J. L. McBRIDE
. . . a cementer in 1924 . . . is now manager of Howco's North Louisiana, Arkansas and Mississippi Division.

EVERYTHING'S UP BUT THE PRICE . . .

The men have gone up. W. R. McClendon, a cementer in 1924, is now President of the Halliburton Company. J. L. McBride, also a cementer in 1924, is now manager of Howco's North Louisiana, Arkansas, and Mississippi Division.

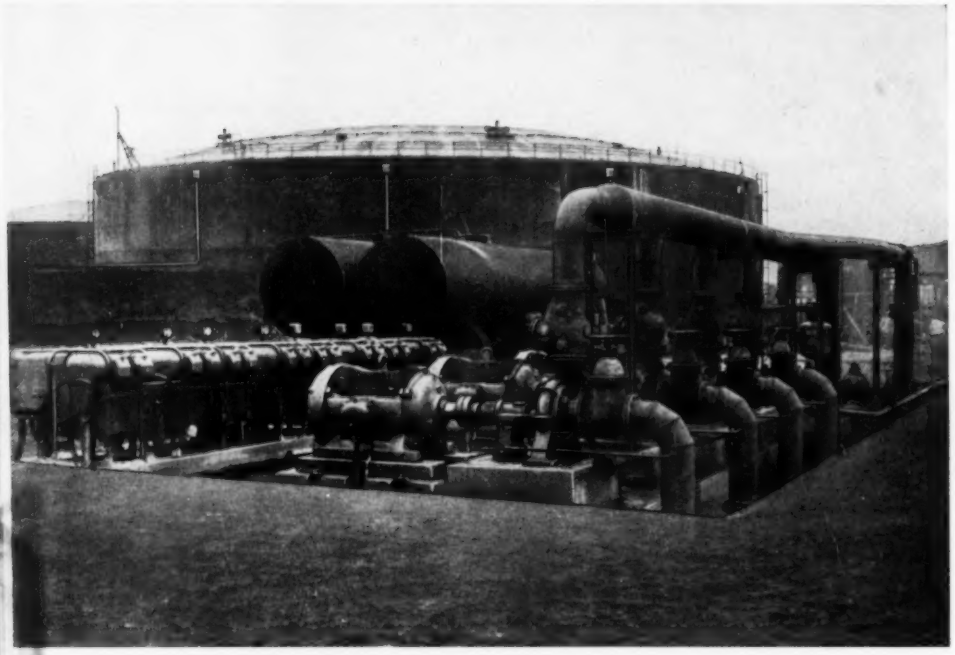
The cost of cementing trucks has gone up—from $6,000 in 1924 to more than $50,000 today.

Cementers' wages have gone up by more than 70%.

Only one element of a cementing job has gone down. The price of the average job today is less than it was in 1924!

Erle P. Halliburton

Chairman of the Company
HALLIBURTON OIL WELL CEMENTING CO.
Duncan, Oklahoma



Admixing station No. 1 with foam chambers and 184-foot tank in background.

Automatic

DEVELOPMENT in Germany of a mechanical air foam system for protecting oil tanks has resulted from experiences during the war and has found expression at Gelsenkirchen. Failures in extinguishing some of the large fires that occurred in the war period brought about criticism of the then existing methods and equipment and led to proposals for the elimination of defects.

Requirements put forward by the oil industry and by the fire service based on experience and study included the following: The foam-making branch pipes or generators must be kept free from clogging due to rust in the pipe line, which requires the use of large nozzles; they must produce foam at about 40 psi; they must be able to transport the foam through pipes for a distance at least equal to the width of the tank pit and to the top of the tank so that the same foam-making branch pipes can be used to supply foam either to the tank or to the pit.

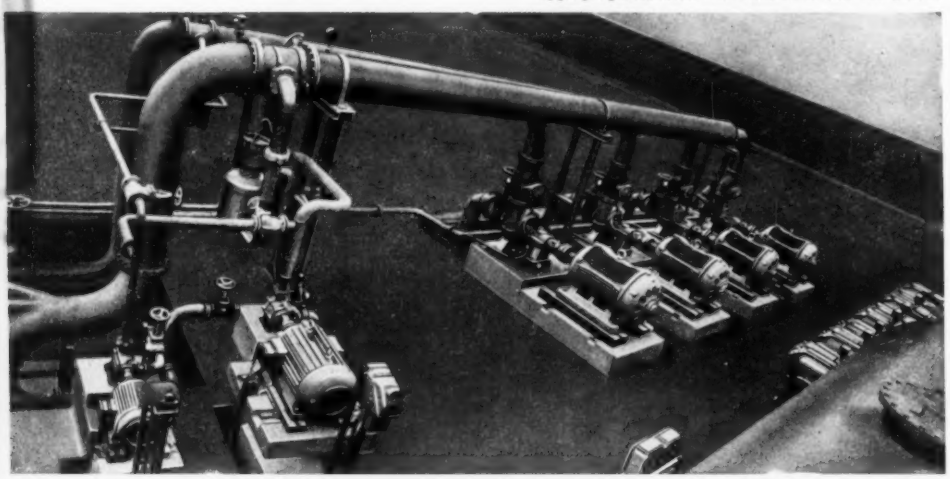
Special weight was attached by governmental authorities to the sealing of the foam entry. This seal must on the one hand remain intact during the breathing of the tank, and on the other hand, when the foam installation is put into operation, the seal must burst at low pressure and the whole of the pipe section be freed for foam entry.

Guides should be so attached at the foam entry inside the tank that the foam is directed with the lowest possible velocity in a gentle stream to the burning surface, causing a ring of foam to form along the tank wall so that the direct contact of the fire with the tank is stopped as quickly as possible.

A correct proportioning should be automatic even when the amount of water passing through the admixer varies on account of foam branch pipes being "cut-in" or "cut-out."

TOTAL Kommanditgesellschaft Foerstner & Co., who originally developed the mechanical air foam system and made it available for

Admixing station showing water pumps at right, foam compound pumps at left. Pressure type proportionator and venturi in line are above.



German refinery tankage is protected by a foam system equipped with low pressure frangible seals and automatic foam mixing devices, the entire tank system capable of being operated by one man.

Foam Installation

Condensed from a paper by D. Kurt Möbius and F. Emmrich, Mannheim, Germany.

practical use, constructed the first installation built to meet the above requirements. It is also the largest yet built in Europe, with a total water capacity of about 11,200 gpm at 70 psi, or about 72,500 gpm foam. Among the tanks to be protected by this installation there are some of a diameter of 184 feet, equivalent to an area of 26,500 sq. ft.

This air foam installation, erected in the plant of the Gelsenberg Benzin A.G., Gelsenkirchen, has two admixing stations. Station One protects 16 tanks with a capacity of 700,000 barrels. At the same time the station can be used to cover a surface of approximately 224,000 sq. ft. including tank pits and pipe trenches and tunnels. Station Two protects 14 tanks with a capacity of 150,000 barrels.

Experience during the past years has shown that it is of prime importance to start giving foam within a very few minutes after outbreak of fire simultaneously from as many points as possible, using a quick flowing foam of definite qualities. The foam capacity of the installation must be large enough to produce a foam blanket of approximately 49 inches in 15 minutes. The equipment was designed to attain weight of 0.154. With this foam factor, which was checked during trials, the water requirement was 8,325 gpm. The water capacity was increased by about 20 percent to 10,200 gpm to enable the simultaneous attachment of mobile apparatus. The necessary centrifugal pumps, the tanks and pumps for the storage and delivery of the foam compound, the proportionator for the automatic admixture, and the distributing station with electrically controlled valves are installed frost-proof in a special building.

Four single-stage, medium-pressure pumps are driven by explosion proof 160 kw high-tension motors. Two circuits, each of which can be supplied from two different power stations, ensure that the pumps can be put into operation even in the event of an electrical breakdown. Water is supplied under a pressure of seven pounds through a 40-inch pipe line. The pumps are connected to a 20-inch main line with check valves in the feeders and work at a pressure of 115 pounds. Inside the station, immediately behind the pumps, a line branches off to a neighboring tank group. Each of these two main supply lines is equipped with a pressure-type proportionator which automatically adds 3.5 percent foam compound to the water. A drop in the water delivery to 1/10 of the nominal capacity causes no change in the percentage of admixture. The pressure loss caused by the proportionators at a maximum capacity of 10,500 gpm does not exceed six psi.

The foam compound is stored in three 6,600-gallon storage tanks and flows to the two foam compound pumps, each of which supplies one proportionator. The foam compound pumps deliver at a pressure approximately 15 pounds above water pressure.

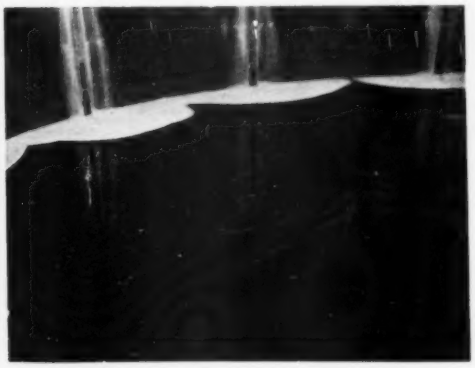
By means of special regulating orifices, the percentage of admixture can be adjusted to the value giving the desired foam quality; at the same time an automatic adjustment for viscosity is achieved. Special pipe lines for the foam compound to the individual foam-making branches are not needed.

Behind the proportionator for the larger tank group, the pipe line divides into three branches. For the largest tanks each branch-line is equipped with an electrically operated 20-inch valve whose time of opening is adjusted to the pump capacity. The main lines supply ring lines around each tank wall to which, for each of the 184-foot tanks, 12 foam-making branchpipes are attached. Should one of the foam pipe lines be damaged, for example by an explosion, the branch-pipe in question can be cut out by closing the valve in its supply-line which is normally open.

The foam-making branchpipes are on the outside of the fire wall. Each branch pipe requires 630 gpm of water-foam compound solution at a pressure of 70 pounds and produces 3,900-4,200 gpm foam. The foam-making branchpipes are fitted with a specially designed central nozzle with a large orifice, thus practically eliminating the possibility of clogging.

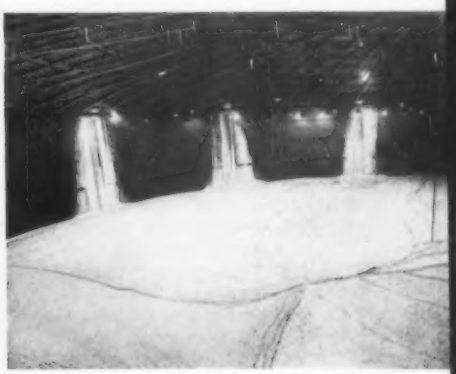
Foam chambers which contain gas-tight glass seals are built into the foam lines where they enter the tank. Each foam chamber is fitted with an easily removable cover so that a quick inspection of the glass seal is always possible. When the foam-making branchpipe is put into operation, air in the foam line is compressed and the glass seal is burst at a pressure of approximately seven pounds. With the covers of the foam chambers removed, the foam installation can be put into operation for trial purposes without the foam entering the tanks. The foam then simply flows over the edges of the foam chambers. The foam chamber has a further important function as its construction reduces the com-

Inside view of 184-foot tank at start of foam delivery.



Foam blanket after 60 seconds.

Foam blanket after 80 seconds.



Foam and water thrower operating with foam.

Foam and water thrower spraying water to cool tank.

paratively high speed of the foam in the foam pipe line. This is necessary to assure that the foam reaches the liquid surface without spraying and in a compact stream.

After the foam enters the tank, it flows through box-like foam guides attached to the tank walls, in which its speed is further reduced to avoid a hard impact on the liquid surface, agitation of the liquid, and loss through immersion. The foam guides further cause the foam to flow parallel to the tank wall and thus help in the formation of a foam ring inside the wall which is decisive for quick extinguishing results. As soon as the foam ring is formed, the heat stresses on the tank walls are reduced and the danger of inflammable gases being re-ignited by the hot walls is inhibited. On the side toward the middle of the tank, the foam guides are made of sheet iron that protect the foam flowing inside against heat radiation and consequent loss.

Tank protection would be incomplete if at the same time measures were not taken to protect the pits in which they stand. The surrounding pit must always be extinguished before one can think of extinguishing the fire in the tank itself. As experience has shown, with the use of mobile apparatus it is very difficult and takes considerable time to extinguish such large surfaces, in particular the area immediately around the tank. For this reason, pit foam outlets were built into the horizontal part of the foam pipe line between the fire wall and the tank. These outlets enable the foam-making branch pipes to be used to form a foam ring quickly around the outside of the tank. They consist of short branches closed by weighted flaps which can be operated by means of wire ropes from a protected position behind the fire wall. When the flaps are open, the full foam capacity is directed into the pit. When the fire in the pit is extinguished, the flaps are closed and the foam flows into the tank.

Besides the tanks and tank pits, pipe trenches and cellars had to be protected. The necessary foam piping is up to 130 feet long and equipped at intervals with foam nozzles. Barriers of foam are thus formed at intervals which divide the trenches into sections so that if inflammable liquids leak from the pipe lines, an extension of the fire is prevented. The foam barriers quickly spread to form a blanket covering the whole surface.

All pipe lines carrying water-foam compound solution are equipped at suitable points with hose connections for attaching mobile foam-making branch pipes. The fire brigade is thus in a position to draw the solution under pressure from the piping system of the stationary installation, avoiding the necessity of introducing mobile proportionators with a corresponding increase in the time of preparation.

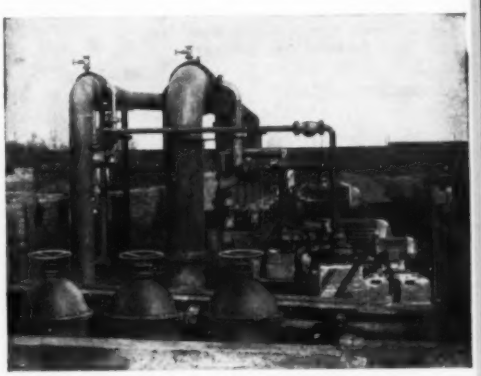
At a trial of the installation on a 184-foot tank, an oil film was placed on a layer of water about six feet deep. To allow the foam entry and the spreading of the foam blanket to be observed, the inside of the tank was lighted by nitrophot lamps. A platform which could be reached through a manhole was suspended from the middle of the roof for observation purposes.

Only 150 seconds after giving the starting command, the first glass seal burst and foam issued from the foam guide. Twenty seconds later foam was issuing from all guides and a close ring of foam had formed along the tank wall. The foam blanket spread very quickly and 80 seconds after foam first issued, the entire tank surface was covered. The theoretical thickness of the foam blanket calculated from the foam capacity of the branch pipes used and the time taken to cover the surface was 3.15 inches. The foam capacity of the branch pipes attached to the tank amounted to 33,000 gpm. Instead of a planned theoretical foam blanket of 49 inches in 15 minutes, the trial showed that in 15 minutes a blanket 52 inches thick could be obtained. Forty-eight hours after the termination of the trial, no marked shrinkage of the foam blanket was ascertainable. The surface was then still entirely covered, although in the meanwhile water had been added.

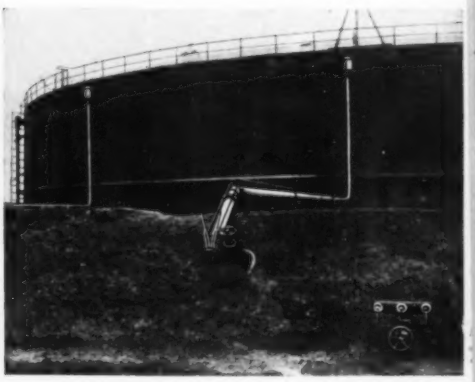
The operation of the foam-making branch pipes attached to the tank would have given a partial proof of the capacity of the whole installation, as the attachment of mobile appliances was also to be provided for. As a consequence, during the trial, at connection points in the tank ringline, a mobile foam gun and six branch pipes for manual operation with a total water consumption of 1,580 gpm were attached. By the addition of these mobile units the planned water capacity was reached in full. The pressure at the foam-making branch pipes was between 85 and 100 pounds with a water supply pressure at the pumps of 15 pounds. The foam gun had a throw of about 165 feet. From the road beside the fire wall, foam was thrown almost to the middle of the tank room.

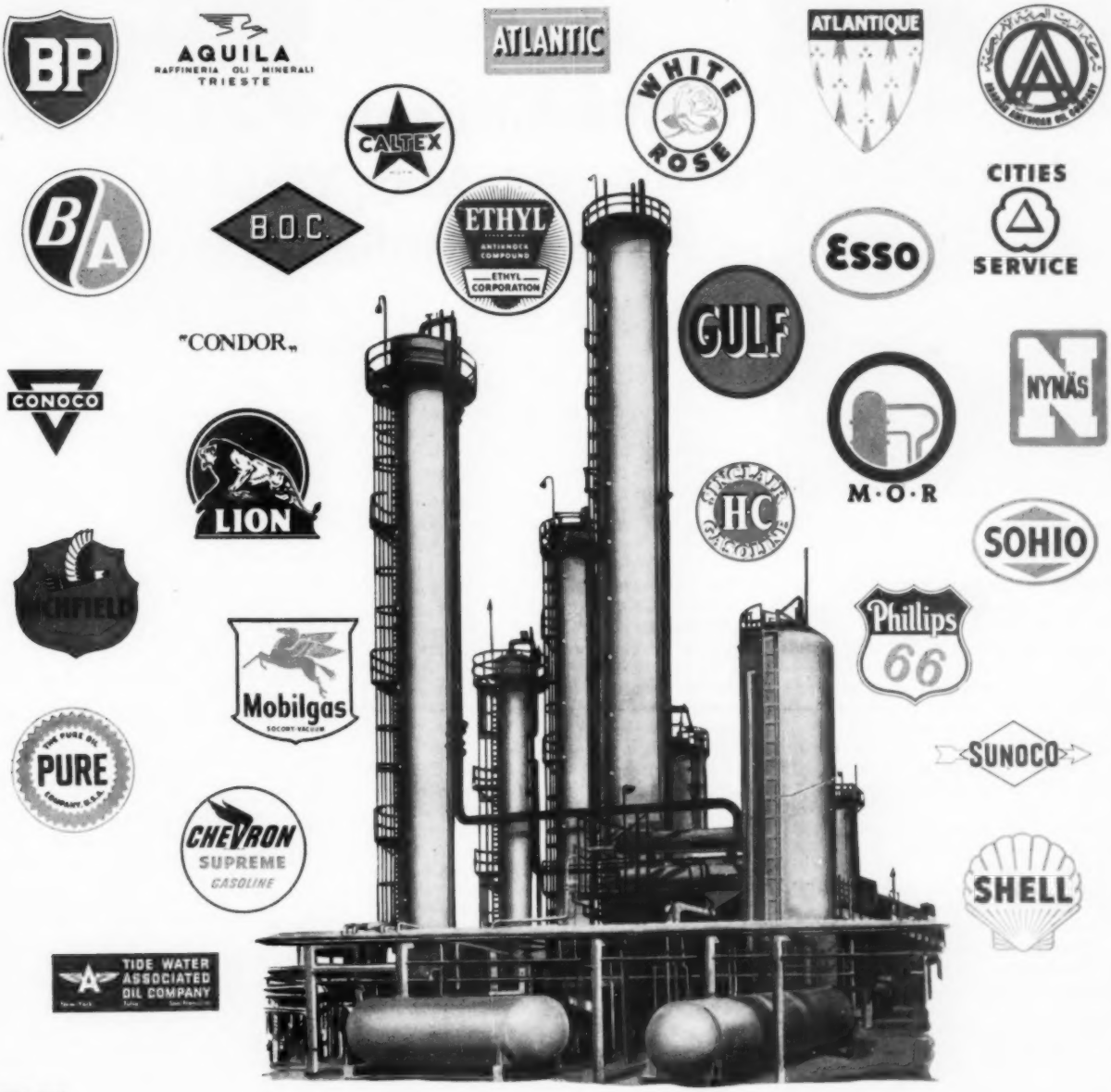
The foam and water gun first shown during this trial is a new appliance. By changing the nozzles, which can be done in a few seconds, it can be used not only to throw foam for fighting oil fires, but also to throw a water spray for cooling purposes, to form a rain wall in front of endangered tanks, or, with another nozzle, to throw a compact stream of water. At a flow pressure of 70 pounds, its water capacity is 630 gpm, the foam produced is 4,200 gpm, and with the nozzle at an inclination of about 30°, the throw of the gun with foam or water spray is approximately 140 feet. With a nozzle for a compact stream it is around 165 feet. By increasing the pressure the throws can be increased to 195 and 230 feet respectively.

During the trial, proof was given that one man, by means of simple mechanical manipulations, can put the installation into operation and that it then works immediately and continues to deliver foam uniformly without the necessity of any further regulation.



Above, admixing station from foam compound side. Below, branchpipe with service valve and operating levers for dyke foam outlets, foam riser and foam chamber. Connections for mobile apparatus are shown in right foreground.





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Mid-Burbank Water Flood May Yield Five Million Barrels

By Ruth Sheldon Knowles

Osage Nation Chief Paul Pitts (left) and William Wycoff Smith (right), president of Kewanee Oil Company, turn the valve to start waterflooding the Mid-Burbank Unit at the inaugural ceremonies November 15.

UNDER the spreading limbs of the "million dollar" elm tree beside the India Agency building where seven-figure bids once were offered for production rights to oil-rich Osage lands, a new chapter in the history of this famous region was opened on November 15. The occasion was the ceremony inaugurating the opening of the Mid-Burbank unit of the world's largest water flooding project which is expected to yield additional millions of barrels of oil which otherwise could not be recovered. The estimate is that this will amount to 4,500,000 barrels or more and hence will be equivalent to the finding of a new field of substantial size.

Speakers at the ceremony which began in the filter plant building in the field paid tribute, each in his own way, to the undertaking as an indication of what can be accomplished by the voluntary cooperation of free men under a system of free enterprise. The group included the representatives of many interests which had been coordinated in a common purpose. There were the members of the Tribal Council representing the landowners, the Osage Nation, officials of the Bureau of Indian Affairs, and spokesmen for the four oil companies, Kewanee, Gulf, Texas and Skelly, which form the Mid-Burbank unit.

"The progressiveness of the Osage Tribal Council has made this possible," said J. B. Steele, general superintendent of Kewanee Oil Co. in introducing Chief Paul Pitts. The Chief expressed the feelings of the landowners in his comment, "I think it is always gratifying to any group to know that its dealings with business associates are conducted on a friendly and satisfactory basis and the Osage Council feels that its dealings with members of the oil industry operating in the Osage Reservation have been on this basis."

Only five months previously the Osage Council had participated in inaugural ceremonies marking the water flooding of the North Burbank field.[1] Looking forward to the day when the water flooding of the South Burbank unit will be started, Chief Pitts stated, "It is the sincere hope of the members of the Tribal Council that with the initiation of this water flood program, the plan of development will go forward uninterrupted and will prove beneficial to all concerned and will eventually include all of that area in the Burbank field not now covered by a water flooding program."

T. B. Hall, superintendent of the Osage Indian Agency, viewed the occasion as "a great day for the Osages, Osage County, our state and our country, proving the value of unit operation under a single program to recover one of our most vital resources."

The theme of cooperation was summed up enthusiastically in another way by William Wycoff Smith, president of Kewanee Oil Co., which operates the unit and was host at the inauguration. Pointing out that Kewanee is particularly proud of initiating Burbank field development by discovering the Stanley Stringer, President Smith said, "This is the perfect way to view the American business system at work. Here we have landowners, major companies, small companies and even government agencies cooperating together. Wouldn't it be swell if something like this could happen every day!"

The Mid-Burbank unit is a portion of a long narrow producing reservoir, paralleling the main Burbank field, about one mile removed from its eastern edge. The field was discovered in 1934 and was developed "after the law of capture went out the window," as F. D. Baker, Kewanee's assistant production superintendent, expressed it. The field was developed under good engineering practices and wells drilled never approached the density achieved in the old Burbank field. Its 49 producing wells have a spacing of 17.5 acres per well.

Of the 1,600 surface acres of leases, 862 were productive and up to Nov. 1, 1951 had yielded 5,891,485 barrels of oil. This was a recovery of 6,835 barrels per acre or 187 barrels per acre foot. At the time of intensified development activities, the subsurface pressure approximated 800 pounds per square inch. Due to the applied 20-acre spacing rule, an exacting proration formula and a gas injection program, the decline in bottom hole pressures was retarded to result in a prolonged flowing phase. These measures resulted in a recovery of from 20 to 30 percent over normal expectancy.

The producing formation, the Burbank sand, lying at an approximate depth of 2,900 feet, is a depositional sand bar laid down along the shores of an ancient Pennsylvanian sea during the Cherokee interval. In general, the sand bars are shale bounded and limited in area extensiveness which precludes the existence of water in any appreciable quantity. The producing sand is composed of angular to subangular quartz grains ranging in size from very fine to medium, interspersed with minor amounts of mica and traces of other minerals. In general, the gross thickness of the producing section ranges from 80 to 90 feet with an effective thickness ranging from zero to 80 feet depending upon the degree of redeposition and extensiveness of shale partings or impermeable streaks.

Reservoir engineers dislike predicting how much oil will be recovered by water flooding and stoutly maintain that the same element of risk is involved as in the business of wildcatting. They know the oil is there but whether or not it will be recovered according to paper plans is another matter. "After all, we engineers deal only in imagination," says E. K. Schluntz, of Shell Oil Co., chairman of the Tulsa Chapter API Secondary Recovery Committee. "We put the water in the ground and then assume that all the various steps will happen."

Kewanee's F. D. Baker states that the risk is analogous to a group of men buying a large ranch with a thousand head of cattle for $1,500,000. "They purchase it with the thought that the herd will develop, that when they sell the cattle, the market price will be no lower and that they eventually will make enough money to return their investment with a profit," he said. "We are putting $4,500,000 on the line today without a barrel of oil. At the end of 12 to 18 months we will begin to produce oil. We expect to pick up at least five million barrels but we will have to spend $3,000,000 to operate the properties and pay $600,000 to legislative bodies. By laying down this large investment we are hoping it will be returned in a reasonable time with a profit."

The conservative estimate of oil to be recovered from the beginning of water flooding

(Please turn to page 60)

[1] World Petroleum, October 1951.

Drilling operation of Santa Fe Drilling Co. in Los Organos field. Photo courtesy Empresa Petrolera Fiscal.

Peru Anticipates Greater Development After Passage Of New Petroleum Law

By Dr. J. E. Rassmuss

IN PERU public attention is concentrated on the discussion in Congress of the new petroleum law by which a new and far reaching development of its oil resources is expected with resulting benefits for the general economy of the country. Enactment of the law appears certain as 23 of its articles have now been approved.

As Peru, excepting Venezuela, is the only country in South America that has abolished all exchange restrictions and reintroduced complete liberty of commerce, it offers desirable guarantees for foreign investments. The final draft of the new law was revealed by the recently appointed Minister of Development, Eng. Carlos Salazar, in his address to the Congress on November 9, which was broadcast to the United States. The law shows the decision of the government to revise Peru's past petroleum policy and to develop its oil resources on a large scale by opening the country to foreign capital. The Congress has declared itself in permanent session until the new law is approved.

The most important provision of the proposed law is the abolition of royalty and export taxes, avoiding double taxation for foreign companies and assuming as basis for the taxation only the net earnings of the industry. This principle was accepted previously in the new mining code of last year, which has favored a flourishing mining industry in the country. Another important feature is the admission of a depletion provision which has been fixed at 15 percent in the coastal area and at 27½ percent in the Montana region.

Because of its geographical differences and the resulting different costs, the country has been divided into three zones: the coastal area, the mountains and the Amazon basin. Exploration concessions are enlarged to 20,000 hectares (about 50,000 acres) on the coast and concessionaires are entitled to obtain 20 concessions in the same region or a maximum of 1,000,000 acres in the coastal area. Initial term of exploration is three years, with the option of two extensions of one year each or a total term of five years. The surface tax of 2S/ (12 cents U. S.) per ha. (2.47 acre) increases in the extensions to double and triple the rates effective in the original term.

Exploration concessions can be converted at any time to exploitation concessions without the discovery of oil. At the time of conversion 50 percent of the area reverts to the government in the same manner as in the Venezuelan law. Exploitation concessions up to the number of 10 can be obtained.

The duration of the exploitation concessions on the coast is 40 years with one extension of 20 years. Surface tax of the exploitation concessions, besides a conversion tax, begins at 10 S/ per ha. (60 cents U.S.) and increases every five years for 20 years, decreasing afterwards in a similar proportion corresponding to the decline of production. The surface tax is reduced to the minimum after production declines to one ton per hectare.

In the Amazon basin the area of exploration concessions has been fixed at 50,000 ha. with the maximum of one million ha. (about 2.5 million acres) for each concessionaire. Duration of the exploration term is six years with a maximum of ten years. Surface taxes are reduced to 25 percent of the amounts in the coastal area. The exploitation concessions in the Amazon basin have a duration of 50 years with one 25-year extension. The surface tax of the exploitation concessions in the Amazon basin also is only 25 percent of the coastal zone tax. Larger areas may be granted on the basis of bids.

In the coastal area an income tax of 50 percent of the net earning is assessed after deduction of the expenses, amortizations and other legal reductions. Expenses, which cannot be written off during exploration, can be deducted in equal portions distributed over the exploitation period. In addition depletion of 15 percent on the coast and 27½ percent in the Amazon basin is permited.

In the Amazon basin the income tax is fixed at 10 percent during the first 10 years of exploitation, at 25 percent during the following 10 years, and at 35 percent during the following 10 years. It reaches 50 percent after 30 years.

Depletion cannot surpass 50 percent of the net earnings.

When the producing stage is reached, at the time of export of crude or any refined or other obtained product, in the coastal area an advance against the income tax of 20 percent of the value of crude oil at the point of embarkation is assessed, calculated on the quotation of Mid-Continent crude of the correspondent API grade.

For other areas this advance is substantially reduced to three percent for the first 10 years, five percent for the following 10 years, seven percent for the next 10 years, and 10 percent for the rest of the exploitation time. Transportation cost to the port of shipment is deducted.

The owners of the separated concessions for manufacturing, refining or transport pay only the income tax fixed by the general law for the income of other industrial or commercial enterprises. The duration of these concessions is 40 years with one extension to 80 years.

The transfer of petroleum concessions is charged with a tax of five percent of the value, as in the former law.

As a very important point for the guarantee of foreign investments it is established that the taxes cannot be altered during the time of the concession, considered as a bilateral contract.

The reserved areas and those reverting to the state can be released to foreign companies offering the highest bid.

The existing concessions of the established oil companies in the country can be adapted to the new law by the government with approval of Congress.

Foreign companies organized in Peru after the present law are obliged to offer 30 percent of their shares to national capital for a period of 90 days. After expiration of this term they can dispose of them freely.

The state owned Empresa Petrolera Fiscal can be transformed to a national company restricted to Peruvian shareholders who may purchase 60 percent of the shares, the government retaining 40 per cent.

The new petroleum law is regarded as a modern conception of oil legislation by Peruvians who hope that foreign capital will be encouraged to share in the development of the nation's oil resources. In the coastal zone, where the prospective oil bearing area is estimated at 2,400,000 ha., five to six companies could develop the area according to terms of the new law. The Amazon basin with some 60 million ha. of prospective oil is considered as the most interesting prospect for large scale operations in Peru because of its possible wide reserves, the productibility of the wells and the high grade of the oil found in Ganso Azul. Peruvian officials hope that the area of the concessions established by the new law and the moderate taxes may make this prospect attractive for major companies.

Because of uncertain political conditions in the Middle East and Peru's favorable situation with respect to continental defense, it is believed that Peru's oil could become an important factor. Aside from California, it is the only large area on the Pacific Coast which has possibilities of becoming a large producer. Living and labor costs are lower than in Venezuela, which is an important feature from the commercial point of view.

Italian Government Moves to Coordinate Its Petroleum Interests

By Prof. Saverio Ilardi

To avoid duplication and interference of aims and functions, a proposed National Hydrocarbon Corporation will combine and regroup into appropriate economic sectors the government's numerous oil industry interests.

OVER the years the government of Italy has acquired interests in a number of enterprises and corporations engaged in trade and industry. Its participation ranges from complete ownership to major or minor holdings. These enterprises were founded at different times to accomplish various purposes which the government had in mind. Among these corporations and companies there are some that have purely industrial objects, as for example the AGIP, originated out of a general policy; others, like the National Methane Corp. (ENM) arose out of the exigencies of war.

The number and variety of these corporations and companies controlled by the Italian government have been a source of duplication of aims and functions, with mutual interference in the definitions of their activities. On account of this confusion, the government has taken the initiative to coordinate and regroup them into appropriate economic sectors. With this idea in view, the Council of Ministers has approved a project of law to be discussed and ratified by the Parliament. According to this proposed law, the task of coordinating and putting in order the oil companies and corporations in which the government is interested will be entrusted to a new organism to be called Ente Nazionale degli Idrocarburi (ENI) or National Hydrocarbon Corporation. Before describing the objects and functions assigned to the new corporation it will be of interest to indicate the extent of the activity of the Italian government in various phases of the oil business.

The Azienda General Italiana Petroli (AGIP) is a stock company with a capital of two billion lire, of which 60 percent is owned by the government and the remaining 40 percent, in equal parts, by the Istituto Nazionale delle Assicurazioni (the huge government insurance corporation), and the Istituto Nazional della Previdenza Sociale (institute for social providence). The function of the AGIP is to engage in all activities pertaining to the oil industry and trade in oil products. This includes exploration and exploitation of hydrocarbons for its own account or that of others. The AGIP is conducting a systematic exploration of Italian territory, has had some good results in the Paduan Plain, and has demonstrated the existence of a large carbon deposit at Caviaga di Lodi. Numerous other possibilities have been indicated in the Paduan Plain. Drillings in the territory of San Giorgio Piacentino, Ripalta (Crema), Cortemaggiore (Piacenza), and Cornegliano Laudense (Lodi) have given promise of commercial production.

AGIP has brought into production five fields, among which the Cortemaggiore has shown the presence of important quantities of oil and gas which contains a large proportion of hydrocarbons that are liquifiable at low pressure. In the other four fields, there is a substantial reserve of methane gas, which is being produced at a rate of between two and 2.5 million cubic meters (70.6-88.2 million cubic feet) a day. These rates are below productive capacity, which is limited to the extent of present demand. The maximum potential of these methane fields is calculated at six million cubic meters (211.8 million cubic feet) a day. It is expected that further exploration and drilling will enlarge this potential.

AGIP is active also in the gasoline and fuel oil trade, and its distribution of oil products supplies a fourth of the total Italian consumption. The AGIP organization includes 11 subsidiaries, about 100 agencies and numerous interior and coastal depots. The number of distributors in the whole Italian territory is more than 5,000. AGIP owns eight tankers for the transport of crude and has two others building which will have a capacity of 18,000 tons each.

Besides carrying on these activities of its own, AGIP participates in various proportions in the capital of other important national petroleum companies. It also controls the Industria Raffinazione Olii Minerali (IROM), a stock company with a capital of 2.9 billion lire, of which 51 percent is subscribed by AGIP and 49 percent by the Anglo-Iranian Oil Co. (AIOC). IROM has an oil refinery at Marghera with a capacity of 550,000 tons per year, which is being increased to 1,100,000 tons. AGIP also controls the Raffineria Olii Minerali S.A. (ROMSA), which has a capital of 200 million lire, distributed between the Demanio (Crown Lands) of the state (50.01 percent) and the AGIP (49.99 percent). In its Marghera plant, ROMSA produces lubricating oils for autos and industrial use, as well as asphalt and bitumens that are distributed throughout Italy. Eighty percent of the capital of Societa Nazionale Metanodotti, (SNAM) a gas pipe line company, amounting to 260 million lire, is held by AGIP and the remainder is held by the Demanio. SNAM has built and is operating about 430 kilometers of natural gas pipe lines with a capacity of five million cubic meters (177.7 million cubic feet) a day. These pipe lines conduct methane from the sources to Milan, Piacenza, Bergamo, Parma and Reggio Emilia. This pipe line system is being enlarged; during the first part of 1952 its capacity will reach 3,535 million cubic feet, and will extend natural gas service to Brescia, Como, Varese, Cremona and Turin.

SNAM also holds 38 percent of the capital stock of Azienda Metanodotti Padani (AMP) which operates a group of pipe lines distributing natural gas from the Polesine region.

AGIP, along with Societa Montecatini, Edison, Falck and Azienda Elettrica Municipale di Milano, has important interests in the Societa Termoelettrica Italiana (STEI), which is finishing an electric power plant at 120,000 KW, using methane for fuel. It also participates in Azienda Nazionale Idrogenazione Combustibili (ANIC) to the extent of 3.2 percent, and in various companies of less importance, as RIOT, which manufactures white oils for transformers, SPEM, a company which outfits oil tankers, and other enterprises that supply air fields and bunkers.

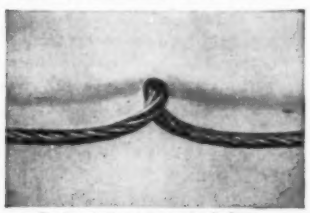
The government Crown Lands also have an important participation in the Azienda Nazionale Idrogenazione Combustibili (ANIC), with a capital of 7.2 billion lire, of which the government holds 40.6 percent, besides 3.2 percent held by the AGIP. The ANIC is engaged in the mineral and chemical industries and particularly in synthetic fuels by hydrogenation. Up to the end of May, 1950, it operated the two great refineries at Livorno and Bari which subsequently, by agreement with the Standard Oil Co. (N. J.), were transfered to the Societa STANIC, in which ANIC and Standard have equal participation.

These refineries are being enlarged, and within a short time are expected to attain a capacity of two million tons per year. On its own, ANIC possesses an industrial establishment at Novara to which is attached a chemical laboratory for petroleum research, and has control of the Societa Chimica Lombarda A. E. Bianchi & Co. of Rho, which is engaged in the manufacture of chemicals, dyes and in other

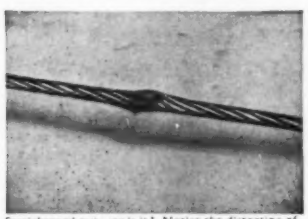
(Please turn to page 65)

Let's hope somebody sees this wire rope in time. It only needs 'unkinking' but the offending loop *must* be 'lifted' out by hand. If it is merely pulled tight, the rope may *seem* to straighten itself but closer examination will show serious distortion of the strands — as the illustrations reveal. The application of a load does not remove a kink —it merely distorts the rope and permanently impairs its efficiency.

HOW NOT TO STRAIGHTEN OUT A KINK



The loop is almost removed — by force.



Straightened out—or is it? Notice the distortion of the strands—it spells trouble ahead.

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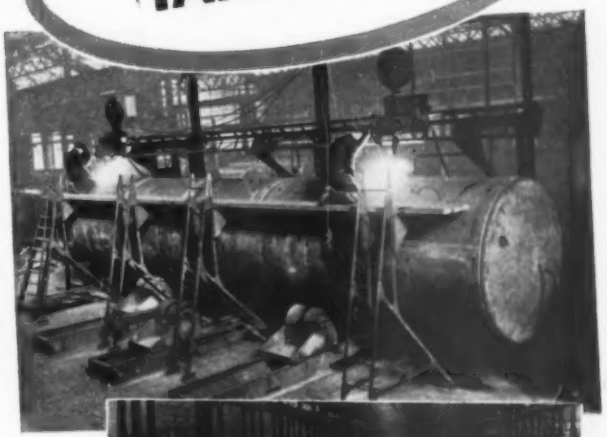

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Anglo-Iranian Report

(Continued from page 39)

a supplemental agreement by the representatives of both parties, and the subsequent offer of the company to substitute a 50-50 division of earnings if that were preferred by Iran are described in the report. It was not until the assassination of Premier Ali Razmuri in March, 1951 and the accession to power of the National Front party of Dr. Mossadegh that the legislation outlawing the company and assuming governmental control of its properties was enacted despite the protest of the company that "at no time has it refused, nor does it refuse now, to consider alteration of conditions by agreement."

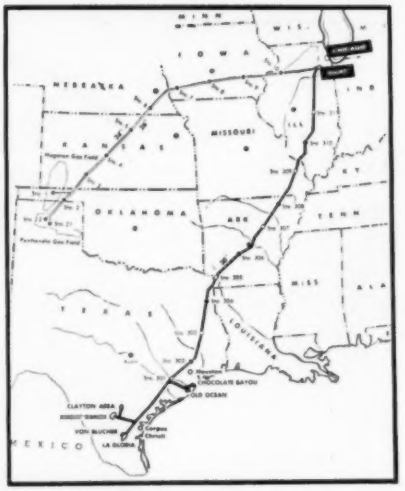
In refutation of the claim that the revised terms offered to Iran were less favorable than those enjoyed by other Middle East countries, the report says:

"If there had been no interruption in the company's operations, it is estimated that the payment to the Government from a 50-50 sharing of 1951 profits from Iran operations would, due to increasing output and higher prices with resulting larger profit margins, have been of the order of £50,000,000. This is a greater sum than Iran would have received from the Supplemental Agreement. In comparing the two systems, the basic fact is that although the 50-50 system would be more profitable to Iran in years of high profit margins, the Supplemental Agreement system would be better when profit margins are low. But the weight of evidence is that over a term of years there is little to choose between them."

After final rejection of the offer, submitted through a representative of the British government, to transfer the Iranian assets of Anglo-Iranian to the National Iranian Oil Company against compensation to be agreed upon, to set up a purchasing organization with Iranian representation on its board, and to purchase the oil produced at prices which would provide an equal division of earnings, increasing pressure upon the company's representatives forced their withdrawal and cessation of the company's operations.

In the final paragraph of this section of his report Sir William Fraser, chairman of Anglo-Iranian, says:

"I cannot conclude this account without making a clear statement on behalf of the company with regard to the accusations that have been made by the Iranian government to the effect that the company has been guilty of falsification of its accounts, that it has used political interference in order to further its interest in Iran, that it has encouraged administrative corruption in Iranian governmental departments, that it has undermined the independence of the Iranian nation. It is a matter of regret to the company that the Iranian government should, by such a distortion of facts, present the company in a completely false light to the world. Not one shred of valid evidence has been or can be produced by the Iranian government in support of these accusations, and the company categorically denies that there is any truth in them whatsoever."



Texas Illinois Pipe Line Opening

THE $135,000,000 thirty-inch gas pipe line of the Texas Illinois Gas Pipeline Company was formally placed in operation on December 5. This is the third large line to supply natural gas from Texas to the metropolitan district of Chicago and intermediate areas. It is the first to transport gas from the Gulf Coast area.

The new line, which is operated by an affiliate of the Peoples Gas Light and Coke Company of Chicago, extends from Falfurrias, Texas, not far from the Rio Grande, to Joliet, Illinois, a distance of 1,005 miles. This portion of the line is of 30-inch diameter. A 20-inch extension northward 58 miles, from Joliet to Volo, Illinois, supplies customers to the north and northwest of Chicago. The system has a present daily capacity of 374 million cubic feet and is designed for an ultimate capacity of 525 million feet.

Construction of the line began in August, 1950. Many obstacles were encountered in its building arising from heavy rainfall and floods on the one hand and delays in obtaining the 375,000 tons of steel pipe required for its construction on the other. Most of the pipe was fabricated by the A. O. Smith Co. at its Houston, Texas, plant and by the Youngstown Sheet and Tube Co., but part was imported from Belgium and Germany. Nevertheless the line was completed on schedule.

Five compressor stations have been provided for initial operation of the line. Five gas powered internal combustion engines in each station supply the 50,000 hp. needed. Provision has been made for the addition and equipment of six more stations to raise the figure to 154,000 hp.

Officiating at the opening ceremonies were Mayor Martin H. Kennelly of Chicago, Joseph J. Hedrick, president of Texas Illinois Gas Pipeline Co., James F. Gates, Jr., board chairman of Texas Illinois and chairman of Peoples Gas Light and Coke Co., and Mark V. Burlingame, vice president in charge of Texas Illinois operations.

Mid-Burbank Waterflood

(Continued from page 54)

628 productive acres is 4,989,480 barrels or 85 percent of the total oil produced to Nov. 1, 1951. Not all of this can be called secondary recovery however, as part of it would have been produced as primary oil in the absence of water flooding. This point was of importance in negotiating the new lease with the Osage Tribal Council. Their leases have always carried a one-sixth royalty, which the operators maintained was too high to permit secondary recovery operations to be competitive with primary production. The Council agreed to reduce the royalty to one-eighth on all secondary recovery oil but wanted the one-sixth royalty to apply to the primary oil left in the pool. Engineers estimated 600,000 barrels of primary oil were left so the formula worked out pays one-sixth royalty on the first 9,000 barrels produced each month and one-eighth on all in excess. After 600,000 barrels is produced at one-sixth royalty, the straight one-eighth will apply for the remaining life of the field.

The Mid-Burbank unit has a 20-acre five spot pattern, with 24 new wells drilled, achieving an overall density of 8.6 acres per well. Since the flood pattern uses ten old wells also, special care was exercised to insure an unimpeded flow of water to the producing section.

Injection of 50,000,000 barrels of water, at the rate of 15,000 to 20,000 barrels a day, will be required to carry out the project. A total of 25,000,000 barrels will come from the Ark-Burbank water flood system and the remainder from reclaimed produced water.

The water supply system is another example of voluntary cooperation. Twenty-eight operators in the North Burbank and South Burbank units, the Stanley Stringer and the Fairfax Pool joined to construct the water system. Designed to handle all their needs at peak demand, the water comes from wells drilled to the alluvium along the banks of the Arkansas river, seven miles west of the North Burbank unit. The operation is comparable to supplying water for a city of 75,000 people.

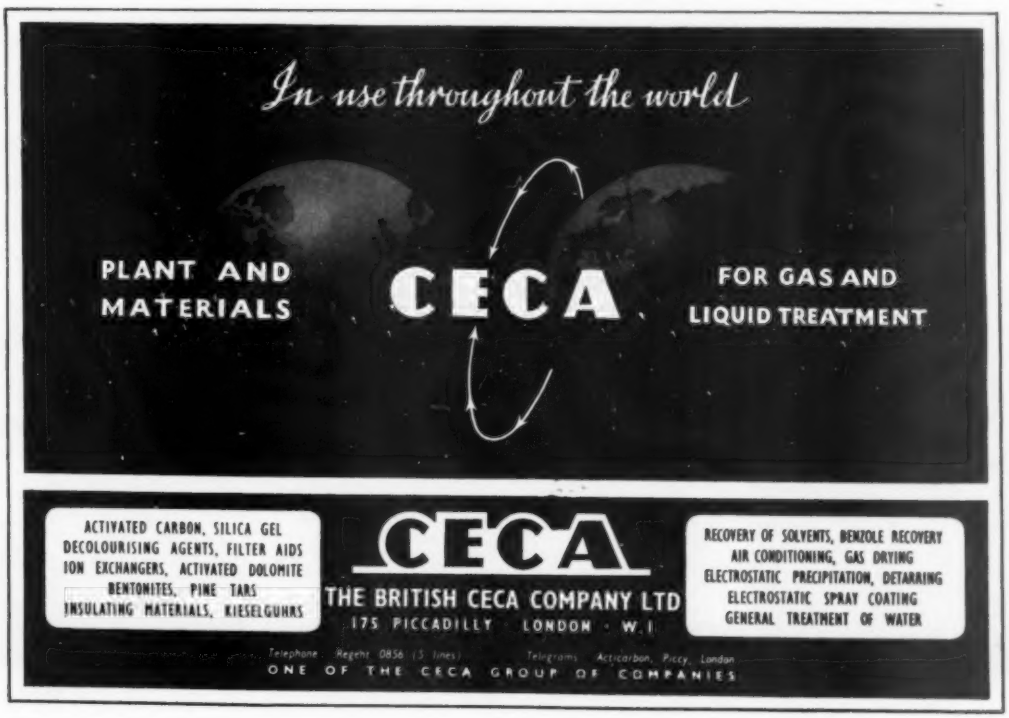
The pumping process will be used on the Mid-Burbank unit and an electrical distribution system was decided upon as being more economical in the long run than gas for prime mover power. New pumping equipment had to replace all old equipment. A total of 2,132 tons of steel is represented in all the tubular goods, tanks, treaters, filters, pumps and motors required to put the system in operation.

Water flooding the Burbank area is spectacular in that it is the largest such project in the world, but in reality it is only a beginning. The art of secondary recovery is actually in its infancy. This was strikingly brought out in Mr. Baker's Mid-Burbank inaugural remarks. "We estimate that in this unit alone there are 19 million barrels of oil," he said. "We have produced six million and we now expect by this water flooding operation to produce another five million. But when we finish we will still be leaving 14 million barrels of oil in the ground. That is the challenge to all of us!"

Geology of the Williston Basin in North Dakota

(Continued from page 48)

Company and Farm	Location	Elevation (feet)	Total Depth (feet)	Date Completed	Remarks
34. Tioga Petroleum Co., No. 1 Math Iverson	C NE NW 18-T. 155N.-R. 95W Williams County	....	....	.....	Still drilling
35. Amerada Petroleum Corp., No. 1 Palmer Dilland	C SW NE 31-T. 156N.-R. 95W. Williams County	....	....	.....	Still drilling. Flowed oil in the Madison
36. Union Oil Co. of Calif., Los Nietos Union Central Life Insurance Co. —Ellis No. 1	NE¼ Sec. 12-T. 161N.-R. 60W. Cavalier County	1,646K.B.	2,271	9-3-51	Dry. Samples available about April, 1952
37. Union Oil Co. of Calif., Los Nietos Restad No. 1	Sec. 26-T. 162N.-R. 64W., Cavalier County	1,630K.B.	3,380	10-51	Dry. Samples available about March, 1952
38. The California Co., Blanche Thompson No. 1	SW SE¼ 31-T. 160N.-R. 81W., Bottineau County	....	....	.....	Spudded in
39. Hunt Oil Co.	C NE SW 3-T. 157N.-R. 78W. McHenry County	....	....	.....	.....
40. Carter Oil Co. N.P.R.R., No. 1	C SW¼ SE¼ 19-T. 4N.-R. 62E. Fallon County, Montana	3,076K.B.	9,680	10-16-41	.....
41. Texas Pacific Oil and Gas and Pure Oil Co., No. 1 Cox	Sec. 23-T. 3N.-R. 61E., Fallon County, Montana	....	....	.....	Still drilling
42. Shell Oil Co., No. 1 Fee (Pine Unit)	SW SW NE 30-T. 12N.-R. 57E. Wibaux County, Montana	2,723 (ground)	....	.....	Still drilling
43. Texas Co., No. 1 N.P.R.R. "B"	C. NE NE 35-T. 15N.-R. 54E. Dawson County, Montana	2,338 (ground)	....	.....	.....
44. Shell Oil Co. Big Muddy Lake	LSD 15-12-3N.-21W., 2 Mer., Saskatchewan	....	....	.....	Still drilling
45. California Standard Hartney 16-33	LSD 16-33-5N.-24W. P.M., Manitoba	1,420	5,138	.....	Tight hole
46. Souris Valley Petroleum, No. 1 Downey	LSD 11-9-T. 1N.-27W. P. M., Manitoba	1,495K.B.	4,881	.....	.....
47. California Standard Daly 7-12	LSD 7-12-T 10N.-R. 28W. P.M. Manitoba	....	....	.....	On production from Madison
48. Shell Oil Co., No. 1 N.P.R.R.	SE NW NW 19-T. 23N.-R. 50E. Dawson County, Montana	2,514 (ground)	....	.....	Still drilling
49. Shell Oil Co., No. 1 Homme	C NW SE 13-T. 20N.-R. 12 E. Perkins County, South Dakota	2,766	....	.....	Still drilling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British Oil News

By E. Lawson Lomax

Oil Industries Club Annual Dinner

The fifteenth annual dinner of the Oil Industries Club was held at Grosvenor House, London, on Nov. 16 where over 900 members and their guests, representing all facets of the petroleum producing and refining industry, enjoyed a program of light speeches, music, and other entertainments. B. J. Ellis, president of the club, presided.

Admiral of the Fleet Sir John H. D. Cunningham, chairman of the Iraq Petroleum Co. Ltd., proposed the toast of the club, pointing out the success the club has had in promoting good fellowship between the oil companies and their suppliers in both the United States and the United Kingdom. Other short addresses were made by Mr. Ellis, Harry W. Rocke, of the Vacuum Oil Co. Ltd., and O. H. Wansbrough-Jones, principal director of scientific research (Defense) of the Ministry of Supply, who praised the prompt and willing response of the oil industry to demands made on it during the last war and said he felt sure the industry would maintain that high standard in the future.

New Distillation Unit

Manchester Oil Refinery Ltd., whose throughput has risen from 70,000 tons per year pre-war to 115,000 tons per year in 1950-51, proposes to increase its capacity to 150,000 tons by the addition of a 3,500 b/d atmospheric distillation unit already under construction. The new unit will act as a topping plant before the existing vacuum distillation unit, enabling the refinery to use Middle East crude as well as crude from present sources in North and South America. The 120-foot fractionation tower will produce gasoline, white spirits, and other petroleum solvents.

J. Grant

Fire Protection for Refineries

The recent oil fire at Avonmouth has led to considerable discussion of the need for adequate fire protection for oil installations in addition to that which local fire departments can give. Inquiry shows that defense against fire is an integral part of the equipment of the newest refineries and brings out general agreement that the most effective provision is in the form of mobile foam production apparatus operating in conjunction with fixed pipe lines.

Fire fighting equipment at the recently opened Fawley refinery of Esso Petroleum Ltd. includes two Pyrene foam tenders, each carrying a tank holding 600 gallons of foam-making compound, a foam compound tanker carrying 2,500 gallons of compound and a Pyrene motor tender for the transportation of ancillary gear. Foam output from each tender is 4,500 gpm, a rate which can be maintained for 30 minutes without replenishment. Each tender can be used also as a normal fire engine capable of supplying six or eight water jets able to deal with fires when highly inflammable materials are not involved.

Pyrene foam tender at Fawley refinery.

In addition to the major foam fire fighting equipment, portable fire appliances consisting of foam-making branchpipes and fire extinguishers are installed wherever necessary. Dispersed around the site are CO_2 dry chemical fire extinguishers, and for the general protection of the main office building, C.55 water/CO_2 fire extinguishers are installed. A Pyrene automatic CO_2 installation is provided in one part of the laboratory for the protection of valuable equipment, in addition to the normal use of CO_2 hand fire extinguishers.

Personnel Changes

James Grant, who for the past year has been assistant manager at Shell's Stanlow refinery, has been appointed manager of Shell's refinery at Shell Haven (Essex). Mr. Grant, who is 51, has been with the company since 1927, having served in the United States, Trinidad and England. R. W. J. Smith, whom Mr. Grant succeeds, has returned to a head office appointment in London.

Regent Oil Co. Ltd. announces that J. Becke has been appointed commercial director as of November 5. Mr. Becke was previously the business manager of the company.

Vickers Ltd. announces that Commander Sir Robert Micklem and Sir James Reid Young have been appointed joint managing directors of the company. Both have been directors of the company and of other companies in the Vickers group for many years. Sir Robert Micklem is chairman of Vickers-Armstrong Ltd., and Sir James Reid Young is director of finance and administration of that company.

A. L. King has been appointed general staff and industrial relations manager of Shell-Mex and B.P. Ltd. He has been associated with the company since 1928. F. A. Keeling, chief accountant, has joined the management of the company as controller of accounts. Mr. Keeling, who joined the Asiatic Petroleum Co. Ltd. in 1917, was chief accountant of the Shell Co. of Egypt from 1927 to 1934, and chief accountant of the Shell Co. of South Africa from 1935 to 1941, when he joined Shell-Mex and B.P. Ltd.

Oil Company-Dealer Cooperation

With the country's refining program of 20 million tons per year rapidly nearing completion, motorists are becoming more interested in the question of branded fuels and premium grade products. This has not been possible for the past few years during which consumers have been accustomed to "pool spirit" with a view to assisting in the financial recovery of the country and saving dollar purchases.

Before the last war it was customary in the United Kingdom for garages and filling stations to supply various branded grades of motor fuel, the motorist thus being able to purchase his favorite brand at most garages, although this meant the installation of several pumps and underground tanks, necessarily of small individual capacity for different brands.

Now that increased refining capacity promises greater supplies of standard products, petroleum distribution companies are endeavoring to improve their individual sales prospects by cooperating with retailers for the supply at any one garage or filling station of a single brand of gasoline of various grades. If and when branded grades of fuel are introduced, the quality of the grades will undoubtedly show little or no difference between companies, and in such a case, the prosperity of the retailer will depend on the services supplied to his clients, the conveniences offered by his garage or filling station, and the civility of himself or his employees.

Advantages of this new system will be shared by the wholesaler, the retailer, and the motorist. The wholesaler will be able to streamline his delivery fleet by making larger deliveries to a smaller number of stations, thus cutting down his transport costs. The retailer will be able to cut down on his capital equipment, have fewer and consequently less cumbersome deliveries from his supplier and be able to simplify his accounts, while the motorist will have the advantage of civil and quick service. All these advantages must eventually lead to economies which should result in a more economic price structure.

Catalytic Cracker At Fawley

Erection of the 41,000 b/d catalytic cracking plant at the new Esso refinery at Fawley was completed early in November, the plant having been handed over to the operating department for tuning-up prior to going into full production.

Drilling In Nigeria

The test well being drilled in Nigeria by the Shell-D'Arcy Petroleum Co. of Nigeria has reached a depth of 4,560 feet after two months drilling.

J. Becke

OIL AND THE WATERFALL

THIS 22-million-gallon-a-day "waterfall" in one of the cooling towers at Anglo-Iranian's oil refinery in South Wales is part of an expansion project that has already raised the refinery's production to twelve times its pre-war rate.

This in turn forms part of a greater expansion programme on a world-wide scale. Anglo-Iranian and its associated companies operate nine refineries in the United Kingdom, France, Germany, Italy and Australia. A tenth refinery has just gone on stream in Belgium and another new refinery is under construction now in the United Kingdom.

THE BP SHIELD IS THE SYMBOL OF THE WORLD-WIDE ORGANISATION OF

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Company Reports

Owing to profits having been sharply increased, Trinidad Leaseholds, Ltd. is raising its final dividend from 10 percent to 11⅝ percent, tax free, which with the increase in interim dividend from four to five percent raises the total dividend to 16⅝ percent. Net profit has increased from £1,638,719 in 1949 to £3,001,935 due to the processing of record quantities of oil and to higher selling prices which have nullified a continued rise in operating costs. A proposed change in the articles of association of the company would increase the company's borrowing powers from £1,000,000 to over £9,500,000, which does not necessarily mean the intention to raise fresh capital in the near future. Further developments include new capital expenditure on the refinery in Trinidad, the building of additional tanker tonnage, and development of Canadian and other subsidiary and allied interests.

J. I. Thorneycroft and Co. Ltd., shipbuilders and engineers, reports increased profits for the year ending July 31, 1951, after a successful year of operation.

New Avgas Ingredient

Aviation gasoline incorporating a new chemical additive, tri-cresyl phosphate, has been developed by Shell and is undergoing flight tests by BOAC. It is expected that the fouling of spark plugs in aircraft piston engines and the possibility of valve failure will both be greatly reduced by the use of this additive, which has the property of modifying the deposits formed in the cylinders, rendering them non-corrosive and electrically non-conductive to valve material even at the high temperatures prevailing in the cylinders. Since the largest aircraft engines have as many as 28 cylinders, giving a total of 224 plugs and 112 exhaust valves in a four-engined craft, an improvement in the reliability of these parts will lead to reduction in maintenance expense and safer and more efficient operation.

Proposed Indian Oil Refinery

The Burmah Oil Co. and the Shell Group, the two partners in Burmah-Shell, India, are considering the erection of a new refinery at Bombay, and at the request of the Indian government a party representing the companies has arrived in Delhi to discuss the proposal. The cost of the proposed refinery is expected to be about £15,000,000. At present the only refinery in India is that of the Burmah Oil Co. at Digboi in Assam.

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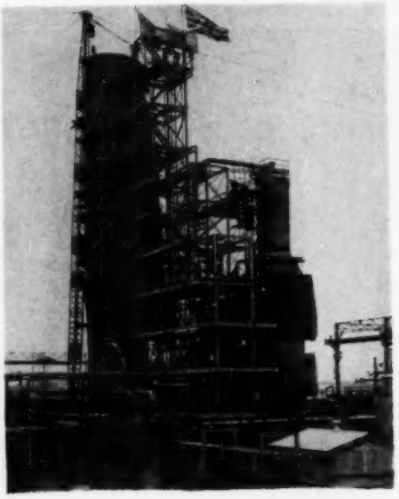

A 35-ton crane placing the "cap" on one of the three columns of the 80,000 b/d distillation unit, one of the largest of its kind in the world, being assembled at the Kent oil refinery.

Progress At AIOC Kent Refinery

One of the three distillation columns of the 80,000 b/d crude distillation unit at Anglo-Iranian's Kent refinery was placed in position early in November, the whole unit scheduled to go on stream in mid-1952. The 40 sections of the column, which weighs 460 tons and is 120 feet high, were brought from America and assembled on site. Designer of the plant, similar in size and capacity to the Abadan installation, is D. B. Badger & Sons (G.B.) Ltd., the main contractors being George Wimpey & Co. Ltd.

Steel for the Oil Industry

Purchase figures of the Esso Petroleum purchasing department for the past four years indicate the increasing production of oil equipment for foreign account in the United Kingdom:

1948	$ 8,490,000
1949	12,169,000
1950	15,565,000
1951	33,960,000

Materials used in the first part of the construction of the Fawley refinery came 59 percent from the United States and 40 percent from the United Kingdom. In the second part, these proportions will be 33.3 percent from the United States and 66.6 from the United Kingdom.

Venezuela is now a large buyer of petroleum equipment from the United Kingdom. At the present time the question of the allocation of steel, both for new work and replacement in the industry, is causing considerable anxiety since manufacturers do not wish to lose the good-will built up with difficulty. The possibility of non-fulfillment of orders due to lack of steel is forcing some manufacturers to refuse orders.

Activity Resumed In Chauk Field

Resumption of normal operations in the Chauk field was signalized by formal ceremonies on Nov. 8. Thakin Nu, prime minister of Burma, officiated at the spudding in of the first new well and later visited the site where the new refinery of the Burmah Oil Co. is being erected. Production at Chauk was interrupted by the war and was held to merely local needs by subsequent internal disorders. Decision to expand operations was a result of negotiations between Gen. W. E. V. Abraham, managing director of the Burmah Oil Co. Ltd., and the Burmese government.

Gas Turbine Vessel Crosses Atlantic

The first ocean-going ship in the world to be driven by a gas turbine, the 12,000 dwt Shell tanker "Auris," arrived in Port Arthur, Texas on November 19 after leaving the River Tyne on October 28. The distance of 4,905 miles was made at an average speed of 9.21 knots, including six days of continuous heavy weather when the normal speed of 12 knots was reduced to seven. The gas turbine ran continuously in conjunction with the three remaining diesel engines throughout the 21-day voyage, it not being necessary to stop or reduce rotor speed for any reason. So marked was the absence of vibration that it was impossible, even by placing a hand on the engine casing, to be certain that the gas turbine was in fact running. Under the full load only a slight whistling noise could be heard. No decision will be made on future developments until the new equipment has been fully tested over two or three round trips.

Tanker News

Harland and Wolff Ltd. has completed at its Belfast Shipyard the 24,000 dwt motor-driven oil tanker "France Stove," the vessel being handed over to her owners, Messrs. Lorentzen & Co. of Oslo, upon the successful completion of her sea trials. She was built under special survey to Det Norske Veritas A. I. and to the requirements of Norwegian ship control and measurement authorities.

The "Eva Peron," an 18,000 dwt oil tanker built to the order of the Argentine government, was launched at the Birkenhead shipyard of Cammell Laird and Co. Ltd. on November 30.

Crude Production Figures

Apex (Trinidad) Oilfields, Ltd. reports production of crude oil and casinghead gasoline for the month of October as 282,119 barrels, Anglo-Ecuadorian Oilfields, Ltd. reporting crude production for the same month at 22,370 long tons. Iraq Petroleum Co. Ltd.'s October production from the Kirkuk field was 687,142 long tons and from the Qatar field 192,632 long tons.

New Burma Oil Agreement

The government of Burma announces that it has reached complete agreement with the major Burmese companies on the terms by which it will acquire one third interest in the production and refining of the country's oil resources.

OIL DRILLING & PRODUCTION
IN VENEZUELA

A weekly report giving oil well drilling and production information on the following countries:

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COLOMBIA
PERU
BOLIVIA
BRAZIL

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Italian Government Moves to Coordinate Its Petroleum Interests

(Continued from page 58)

enterprises of minor importance. ANIC has also acquired 49 percent of the capital of Azienda Colori Nazionali e Affini (ACNA), a dye concern.

The Italian government also has a large participation in the Ente Nazionale Metano, founded in 1949, which is engaged in the natural gas industry, and particularly in the developent of automotive traction by the use of natural gas. The Ente Nazionale Metano is a stock company with a capital of 340,000,000 lire, 38 percent of which is owned by SNAM.

The number and diversity of the oil concerns in which the state is largely interested has induced the government to frame the project of law previously mentioned, through which the new corporation, Ente Nazionale degli Idrocarburi (ENI), will coordinate the activities of these companies and the companies themselves will be reorganized. It is intended that ENI will unitize the petroleum enterprises controlled by the state, expand them and give new direction to their activities, and particularly to exploration, production and distribution of hydrocarbons.

Under this plan, prospecting operations, which up to now have been limited to about a sixth of the area of the Po Valley, will be extended, using existing and acquired material. The corporation will have the exclusive right of exploration and exploitation of the areas held by the various companies and the transport of petroleum products by pipe line, in accordance with Article 43 of the Italian Constitution, which declares: "For the purposes of the general interest, legislation may provide for acquisition by the state, a public corporation, or an existing cooperative, and with provision for indemnity, any enterprise or category of enterprises which are concerned with an essential public service, or a source of power, or a necessary monopoly, which is of pre-eminent general interest."

As was mentioned above, one of the duties of the new corporation will be to initiate activities for the production and utilization of hydrocarbons. Subject to the overall rights of the state, it will search for and exploit deposits in the whole territory of the Po Valley within an area the boundaries of which are set forth in detail in the law. Within the territory thus defined, the corporation will have the exclusive right to construct pipe lines for conveying petroleum products. For the execution of its commission, the state transfers to the corporation all its movable and fixed assets that pertain to activities in petroleum, as in the following list:

	Millions of lire
1. The nominal value of the stock held by the Crown Lands in AGIP, ANIC, ROMSA, and SNAM, and the foundation capital of the National Methane Corp.	4,582
2. The obligations of ANIC.	1,600
3. The establishment situated on the Via Lombardia in Rome, No. 43, now occupied by the Comitato Italiano Petroli (CIP) in liquidation.	218
4. The values invested by the state in prospecting for petroleum throughout the territory of the Italian Republic.	8,600
Total	15,000

These properties, along with 15 billions in cash, make an endowment valued at 30 billion lire. All works of the corporation will have the character of a public utility.

At the same time, the National Methane Corp. (ENM), which at present has the form of a juridical person, will be changed to a stock company, the shares of which will be vested in the ENI, which will also assume the present public functions of ENM. The profits earned by ENI will be devoted to public purposes, and to the extent of 65 percent will be paid directly to the state. The law specifies detailed provisions for the fiscal management of the corporations and companies that are consolidated in ENI and for the internal administration of this corporation.

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Oil company staff changes

WALTER C. PEW has been elected a director of Sun Oil Co. Mr. Pew was general sales manager of Sun for four years before entering the armed forces during World War II. He joined Sun in 1922 and served in the Texas oil fields, Sun Shipbuilding & Dry Dock Co., and the marine department. In 1926 he was transferred to the marketing department where he advanced to general sales manager in 1938. Mr. Pew was commissioned a major in the U. S. Army in 1942. Later, with the rank of colonel, he served as deputy chief of the petrol, oil and lubricants section of Gen. Eisenhower's staff. He was awarded the Legion of Merit by the War Department and also received the Croix de Guerre with palms and the Medaille de Verdun from the French Government.

F. M. SIMPSON has been elected president of Cit-Con Oil Corp. at Lake Charles, La., to succeed Burl S. Watson, who becomes chairman of the executive committee. Mr. Simpson has been vice president and general manager of Cit-Con since its organization in 1947. Cit-Con is one of the largest lubricating oil plants in the country, with an output in excess of 8,000 barrels daily. A native of Texas, Mr. Simpson joined Cities Service Oil Co. upon his graduation from Texas A. & M. College and held various key positions in the Cities Service organization prior to his association with Cit-Con.

F. M. McDANIEL, Great Bend, Kansas, formerly assistant production superintendent for Sunray Oil Corp.'s Kansas district, is being transferred to the Midland, Texas, area, where he will be assistant district superintendent in charge of Sunray's North and West Texas production activities. Sunray has also announced creation of a new operating area for its Spraberry wells formerly attached to the company's Odessa operating area. The new area will include the Sherrod and Boone leases in Upton and Reagan counties. John Binkley, formerly a senior engineer in Sunray's Midland, Texas, production department office, is now field superintendent over the Spraberry area.

W. B. STROBEL, senior chemical engineer in the process division of Continental Oil Company's manufacturing department, has been promoted to the newly created position of technical assistant to Dr. John E. Kircher, Houston manager of the company's petrochemical department. Mr. Strobel will move from Ponca City to Houston.

W. B. Strobel

EDWARD McNEIL, assistant treasurer of Standard Oil Co. (N.J.), has been elected a vice president of Standard Oil Co. of Brazil, an affiliated company. He took up his new duties at Rio de Janeiro Dec. 1. Mr. McNeil became assistant foreign exchange division head in the treasurer's department in 1927. He was placed in charge of the division in 1942 and two years later was appointed assistant treasurer. Besides his treasury work with Jersey Standard he has served as a director of several of its affiliates. He previously served in various positions at Esso's refinery in Bayway, N. J., where he joined the company in 1917.

GEORGE W. CLARKE, director of exploration of Stanolind Oil and Gas Co., has announced a number of staff changes.

George H. Galloway becomes assistant chief geologist-programs in the Tulsa general office, E. W. Price succeeds him as division geologist at Oklahoma City, and E. L. Selk becomes Oklahoma district geologist at Oklahoma City.

William S. McCabe assumes a new title, regional geologist for the Rocky Mountain division and Canada. John C. Johnston succeeds him as division exploration superintendent, and Ross W. Craig becomes division geologist. All three will be located in Casper, Wyo.

In the North Texas-New Mexico division at Fort Worth, Russell Farmer has been promoted to division consulting geologist, and Thomas A. Hendricks to division geologist.

Emile E. Soubry

EMILE E. SOUBRY has been elected a vice president of Standard Oil Co. (N.J.) to climax a 40-year career with the company and its affiliates in the United States and abroad. He joined Anglo-American Oil Co. as a clerk in 1911 and was on leave for service in the British army during World War I.

Mr. Soubry spent considerable time in the United States in the 1930's studying marketing conditions, oil field and refinery operations. Later he received a special marketing assignment to Australia and New Zealand following which he was resident in Europe as adviser to the various Esso European marketing companies. Just before World War II, Mr. Soubry was appointed chairman of the Anglo-American Oil Co. and during the war served on the British Oil Trade Committee and later as liaison between that committee and the United States Government. In 1943 he was appointed foreign marketing coordinator for Jersey Standard and held that position until he was elected a director.

R. E. NELSON, JR., has been elected president of Wyco Pipe Line Co. to succeed Frank O. Prior, resigned. W. A. Bennett has become vice president to succeed Mr. Nelson. D. L. Rankin has been made manager at Denver and will also continue as secretary.

Mr. Prior is executive vice president of Standard Oil Co. (Ind.) at Chicago. Mr. Nelson is general manager of crude oil supply and product pipe lines for Standard at Chicago and continues in that capacity. Mr. Bennett has been general superintendent of Wyco. Mr. Rankin has resigned as manager of Standard's products pipe line department at Chicago and has been succeeded by Sam L. Jackson.

Wyco has a petroleum products pipe line from Casper, Wyo. refineries to terminals at Cheyenne, Wyo., and Denver. It is owned by Standard Oil Co. (Ind.), The Texas Co. and Socony-Vacuum Oil Co.

PORTER L. HOWARD, general traffic manager of Sun Oil Co., retired December 31. He completed 32 years of service with Sun, heading its traffic department during the last 21 years. During World War II Mr. Howard spent over two years in Washington as deputy director of the Liquid Transport Department of the Office of Defense Transportation, and later as director of that department.

DAVID A. SHEPARD, executive assistant to the president, has been elected a director of Standard Oil Co. (N.J.). His election enlarges the board to 15.

Mr. Shepard joined the company in 1927 as a research engineer immediately after his graduation from Massachusetts Institute of Technology. He has had a wide experience with the company's domestic and foreign affiliates. He was engaged until 1934 with oil hydrogenation and product application problems with the Standard Oil Development Co. and later transferred to France as European representative of the Development Company. Later he became a technical adviser on foreign sales for Standard with headquarters in London. During 1942-43, Mr. Shepard was petroleum attache for the United States State Department at the U. S. Embassy in London.

In September 1943, he was appointed shareholders' representative of Jersey Standard in the United Kingdom, serving later as chairman of the board of Anglo-American Oil Co. He came to New York as executive assistant to the president of Jersey Standard in 1949.

David A. Shepard

DR. WILLIAM ARTHUR GRUSE, administrative fellow of the petroleum refining fellowship at Mellon Institute, received the Pittsburgh award for outstanding service to chemistry at a dinner of the Pittsburgh section, American Chemical Society, Dec. 20. The work of his fellowship, sustained by the Gulf Research & Development Co., has resulted in basic improvement in the refining of gasoline, lubricating oil, waxes and other petroleum products. He is the author of two books, "Petroleum and Its Products" and "Chemical Technology of Petroleum."

DON CAMPBELL, John Canning, and J. M. Patterson have been appointed assistant directors of public relations of Standard Oil Co. (Ind.). All have had a part in Standard's growing goodwill-building activities under Conger Reynolds, director. The three will specialize respectively in administration, communication through outside media, and projects and communication in company channels.

I. B. TIETZE has been appointed general superintendent of the crude oil pipe line division of Phillips Pipe Line Co., subsidiary of Phillips Petroleum Co. He continues as assistant to W. H. Wallace, vice president of Phillips Pipe Line Co. Since joining Phillips in 1926, Mr. Tietze has been engaged in pipe line construction and inspection, corrosion prevention and hydraulic and economic studies.

SHERMAN R. LYLE has been appointed district manager of the steel and tube division, northern Pennsylvania and New York state district of The Timken Roller Bearing Company's Cleveland office with headquarters at Buffalo. He has been with Timken as sales engineer for the Cleveland district since 1946.

Harold M. Cosgrove

HAROLD M. COSGROVE of Tulsa, Okla. was presented with a plaque for outstanding service by the Nomads at their annual meeting held recently in Chicago. Mr. Cosgrove has been executive secretary of the Nomads for a number of years.

W. C. WENZEL, executive manager of the Pennsylvania Grade Crude Oil Association, left New York City October 30 by plane for London on a several weeks' tour of Europe. He will visit Association members and survey conditions affecting marketing of Pennsylvania oils.

L. L. TARNE has been named northern division superintendent of the pipe line department of General Petroleum Corp. C. A. McDonald has been appointed assistant division superintendent. Both men will make their headquarters at Taft, Calif. Mr. Tarne, who spent the first twenty of his 29 years with General Petroleum in the Lebec station of the company's Tehachapi pipe line, has been assistant superintendent of the southern division for the last five years. Mr. McDonald, who has been with General Petroleum since 1938, has been safety supervisor.

NORMAN T. ROBEY became an additional assistant general superintendent of the Casper, Wyo., refinery of Standard Oil Co. (Ind.) December 1. He was assistant superintendent of the heavy oils division at Wood River, Ill. Mr. Robey joined Standard in 1936 as a chemical engineer in the Whiting, Ind., research laboratory, where he became a group leader in 1941. Two years later he was transferred to the Wood River refinery as foreman of the catalytic cracking unit.

REGINALD J. S. PIGOTT, director of the engineering division of Gulf Research and development Co., Pittsburgh, has been elected president of The American Society of Mechanical Engineers for 1952. He succeeds J. Calvin Brown of Los Angeles. Mr. Pigott's professional record includes 18 years in petroleum engineering research. He holds more than 30 patents and has written more than 40 technical papers.

CHARLES D. HULL, superintendent of the Ponca City refinery of Continental Oil Co., has been promoted to the newly created position of manager of the refinery. Mr. Hull joined the company in 1919, became assistant to the vice president in 1928, and superintendent of the Ponca City refinery in 1949.

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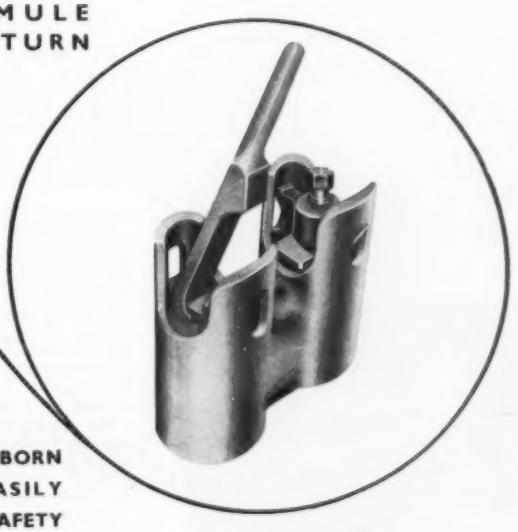

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Howard A. Parker, Jr.

HOWARD A. PARKER, JR., formerly of the research department of Standard of Indiana, has been appointed technical director of Pan-Am Southern Corp.'s Destrehan refinery. Mr. Parker was group leader in charge of process design for the Indiana company. He joined Standard in April 1944 as a process design engineer and two years later became the group leader.

HARRY L. PELZER has been elected a director of Sinclair Research Laboratories, Inc. Mr. Pelzer joined the Sinclair organization in 1919 at the East Chicago refinery, and in 1921 he transferred from the refinery to the research department as a chemical engineer. During World War II he was manager of the butadiene plant of Sinclair Rubber Inc. at Houston. He became assistant manager of the research department in 1946 and manager of the research laboratories in 1951.

T. A. ABBOTT has been appointed to a new position as manager of the engineering research department of Standard Oil Co. (Ind.). Dr. R. B. Jacobs was appointed to a new position as technical director of the department. Mr. Abbott joined Standard in 1946 as executive director of the engineering research department. Dr. Jacobs joined the company in 1947 as associate director of the engineering research department after serving with the National Research council.

Pacific Valves Promotions

Pacific Valves, Inc. has promoted R. C. Macaulay to vice president and general sales manager with headquarters at the company's main office in Long Beach, Calif. He has been sales manager of the west coast division for many years. Succeeding him will be John Gryson, formerly sales engineer.

Chester Steinberger has been appointed vice president and general manager of the Gulf Coast division. He has been in charge of the Houston office and will continue to make Houston his headquarters.

C. Steinberger R. C. Macaulay

Sells Johnston Companies

M. O. Johnston has sold his group of operating oil field service companies to Johnston Testers, Inc. of Houston, Texas. He is not bowing out of the industry he entered as a Spindletop roughneck in his early teens, but remains a substantial stockholder and director in the corporation which purchased his operating organizations.

W. B. "Bill" Taylor, who began his oil field career in Eldorado, Kan., and joined M. O. Johnston in the middle 1930's, heads Johnston Testers, Inc. as president. Since 1942 he has been vice president and general manager of Johnston Oil Field Service Corp., an M. O. Johnston organization which headquartered in Houston and operated throughout the Gulf Coast and Mid-Continent areas. The M. O. Johnston group also included M. O. Johnston Oil Field Service Corp. of Los Angeles, operating in California and the Rocky Mountain States; M. O. Johnston Oil Field Service, Ltd. of Edmonton, Canada; and M. O. Johnston Oil Field Export Corp., of Los Angeles, engaged in exporting Johnston drill stem testing equipment.

M. O. Johnston, working with his brother, the late Edgar C. Johnston of Longview, Texas, pioneered the art of drill stem testing in the 1920's to determine the productive possibilities of drilled formations prior to going to the expense of setting casing. It was a major money saving contribution to drilling and well completion procedure. In their continuous expansion through a quarter century of progress, the M. O. Johnston companies have developed many other underground services which are now contributing valuable aids to drilling and producing companies. Services are available through Johnston Testers, Inc. which maintains service branches in all active spots in the United States and Canada and which exports world-wide.

M. O. Johnston W. B. Taylor

Officers of Johnston Testers, Inc. are: W. B. Taylor, president; J. E. Smith, O. W. Ward and T. M. Johnston, vice presidents; H. F. Junker, secretary-treasurer; and J. H. Hambrick, Jr., assistant secretary-treasurer. Directors are: W. B. Taylor, M. O. Johnston, E. C. Johnston, H. F. Junker, J. E. Smith, L. B. Martin, Ed Rotan and Richard J. Kneedler.

F. W. SCHEINEMAN has been appointed chief engineer of the manufacturing department of Standard Oil Co. (Ind.) to succeed D. A. Monro, who has become manager of the company's purchasing department.

Dr. F. H. Blunck, superintendent of the projects division at Standard's Whiting, Ind., refinery, was advanced to a new position in the general office manufacturing department as manager of the projects, capital expenditures, and miscellaneous contracts division.

Mr. Scheineman joined Standard in 1926 as an engineer at its Whiting refinery. Dr. Blunck joined the company in 1936 as a chemist in the research department at Whiting. During World War II Dr. Blunck was in the chemical warfare service and saw overseas duty.

EINAR B. PAUST, an attorney with the company since 1946, has been appointed associate general counsel of the Esso Standard Oil Co. He joined Esso shortly after his return from service with the U. S. Navy in World War II.

H. R. Wall

H. R. WALL, assistant superintendent of Continental Oil Company's Ponca City, Okla., refinery, has been promoted to superintendent. L. D. Grubb, director of technical services for Cit-Con Oil Corp., Lake Charles, La., has been named assistant superintendent of the Ponca City refinery. Mr. Wall succeeds C. D. Hull, who has been promoted to the newly created position of manager of the Ponca City refinery.

D. R. JOHNSON, manager of Continental Oil Company's manufacturing department, who has maintained headquarters in Ponca City, Okla., moved to Houston Jan. 1 as executive headquarters representative of the company's manufacturing department. He will continue as department manager. Mr. Johnson joined Continental in 1924 in the Glenrock, Wyo., refinery, and went to Ponca City in 1929 as inspector and technologist. He became manager of manufacturing in 1949.

CHARLES RALPH THOMSON has been appointed superintendent of Canadian operations of Sohio Petroleum Co. Prior to coming with Sohio Mr. Ross was employed as petroleum engineer with Socony-Vacuum Exploration Co. in the far north. During World War II he was a squadron leader in the Royal Canadian Air Force, and spent several years in Europe and the Middle East. He has had many years' experience in Western Canada fields.

S. C. BARTLETT has been appointed assistant general manager (administration), and R. W. Debnam assistant general manager (sales) of the domestic sales department of The Texas Co. Mr. Bartlett, who succeeds the late Paul M. Isbill, had been assistant general manager (sales) for the past two years. Mr. Debnam will move to New York from Chicago, where he was sales manager of Texaco's central territory. He will be succeeded there by J. A. Winger.

R. W. Debnam S. C. Bartlett

R. B. McLaughlin

R. B. McLAUGHLIN, president of The Texas Pipe Line Co., has been elected to the newly created position of chairman of the board effective Jan. 1. J. W. Emison, vice president and general manager, succeeded Mr. McLaughlin as president, and J. T. Rynd, vice president and assistant general manager, will become vice president and general manager. F. A. Stivers, a director as well as vice president and assistant general manager, has retired from both positions. L. F. Sherer, assistant general manager (construction and engineering), was elected a director to succeed Mr. Stivers.

Mr. McLaughlin started work for The Texas Co. in 1906. When The Texas Pipe Line Co. was organized in 1917 he became its assistant secretary. He was elected president and general manager in 1947. Mr. Emison started as a clerk with the company in 1920. He was elected vice president and assistant general manager in 1947. Mr. Rynd started work in the oil industry in 1908, and joined The Texas Co. in 1913. He has served continuously since then in pipe line operations. Mr. Stivers, who is retiring as an officer and a director, joined The Texas Co. in 1917, and since 1928 has participated in the construction and operation of Texaco pipe lines.

CLARENCE B. ROUND has been promoted to the newly created position of assistant to Harold G. Osborn, vice president in charge of manufacturing for Continental Oil Co. He will make his headquarters in Ponca City. I. A. Harrisberger will succeed Mr. Round as coordinator of manufacturing operations at Ponca City.

C. L. MAYHALL, vice president of Anderson Prichard Oil Corp. and Col-Tex Refining Co., retired Dec. 3 after 25 years with the company. He had been engaged previously in refinery sales work for a number of Mid-Continent refineries since 1917.

DR. RAYMOND E. SCHAAD has been appointed technical adviser to Col. J. C. Raaen, manager of the research and development laboratories of Universal Oil Products Co., at Riverside, Ill. Dr. Schaad recently completed 25 years of research, patent and development work with Universal.

David S. Kilgour

David S. Kilgour, 60, who retired last July 1 as secretary of the Western Oil and Gas Association after 26 years service, died Nov. 24 of a heart attack. Mr. Kilgour joined the association, then known as the Chamber of Mines and Oil, in 1925 and served successively as auditor and assistant secretary before being named secretary in 1944. From 1933 to 1944 he was secretary of the Pacific Coast section of the division of production of the American Petroleum Institute and was on its advisory committee at the time of his death.

Oil Industry's Story On Radio

The oil industry is pioneering in the field of radio by telling the story of its operations in a series of dramatized programs, a technique used in radio for the first time by any industry.

The Oil Industry Information Committee is making available a transcribed radio series, "Romance of Oil—The Story of an Industry," written and directed by Ruth Sheldon Knowles, nationally known oil writer. The 13 quarter-hour dramatic programs will be heard nationwide, sponsored on local radio stations by individual oil companies, refiners, dealers and jobbers to present the oil industry's story to the general public.

The programs are narrated by John Henry, well-known southwestern radio sports broadcaster and commentator. They feature a skilled cast, a 12-piece orchestra and original musical scores by Joe O'Neill, composer and musical director. Each program dramatizes a particular phase of oil operations and shows how the oil industry has been able to progress under a free system and how competition works in the industry.

The subjects presented in this series are "Oil in Your Life," "Drilling for Oil—The Odds Against Finding It," "The Science of Finding Oil," "Men Against Insects," "How They Built the Big Inch," "Squeezing a Gallon from Every Two Quarts," "Making an Oil Field Last Longer," "Farming with Oil," "The Story of Synthetic Rubber," "Transporting Oil by Water," "Oil for the Wheels of Industry," "Freedom, Competition and Oil," and "Oil and the American Way."

Frank A. Billstone

Frank A. Billstone, 70, former treasurer and director of The Ohio Oil Co., died Nov. 26. On his retirement in 1946, Mr. Billstone had served the company for more than 42 years, rising from a clerical position to guide its accounting and financial affairs.

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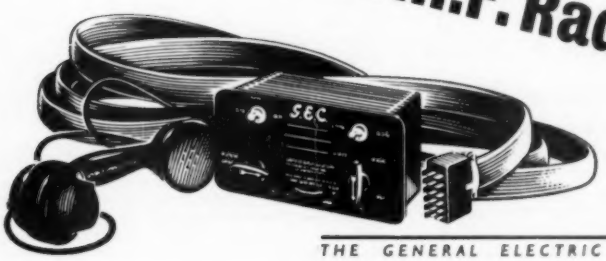


THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

International news and notes

Venezuela Crude Line Supplants Lake Tankers

With a working force of some 700 men engaged in its construction, the 160-mile "Lightline" which will carry crude oil at a rate of 230,000 b/d from the west-side of Lake Maracaibo to the Paraguana Peninsula is making good progress. The line, which will cost $25 million by the time it goes into operation in the summer of 1952, is jointly owned by Shell, Texas Petroleum and Mene Grande Oil companies in the proportions of 88-8/9, 6-6/9 and 4-4/9 percent respectively.

The oil to be transported, to refinery in Shell's case and to deepwater terminals in the case of the other companies, is that produced in Mara field, where Shell operates for itself and for three other companies, and in La Paz, La Concepcion and Sibucara fields, where Shell is the operator and sole concessionaire. Production from these fields is already almost equal to the capacity of the line as designed. Currently, it is being transported in shallow-draft lake tankers.

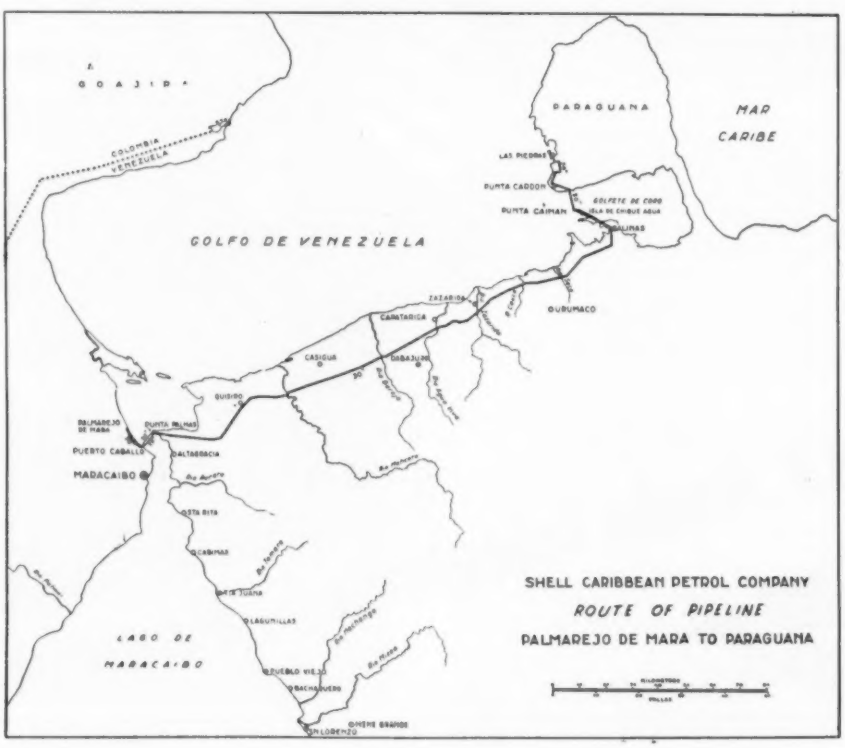
With the exception of the underwater crossing of Lake Maracaibo, where two parallel 20-inch lines will be laid, the line will be built of 30-inch pipe. The weight of the steel to be used is 50,000 net tons. The land portions of the line will be laid on the surface, as is usually the case in Venezuela, with the exception of a five-mile stretch at its beginning, on the west side of the lake, where it will be covered with bitumastic and buried, and for 13 miles south of the Gulf of Coro. This section will be bitumastic-covered and buried, except for a portion which will be carried on an elevated bed over the salt flats of Las Salinas.

From Palmarejo de Mara the line runs south along the west shore of Lake Maracaibo to Puerto Caballo, where it turns northeast for the first underwater crossing. Emerging at Punta Palmas on the east shore, it runs northeast roughly parallel to the coastline, passing near the towns of Quisiro, Casigua, Dabajuro, Capatarida, and Zazarida. From there, it follows the low sand dunes to Punta Caiman, then again goes underwater, to come out on the Peninsula of Paraguana. On the peninsula, the line turns east toward the Shell refinery of Cardon. Then, at an angle southeast of the refinery, it divides and a branch takes off for the storage tanks of the Mene Grande Oil Co. deepwater loading point at Las Piedras.

The submarine crossing of Lake Maracaibo is five miles long. Here the pipe will be covered with bitumastic and laid in two parallel trenches dug nine feet deep and one thousand feet apart at the maximum. In the underwater crossing of the Gulf of Coro, four miles long, the pipe will be covered with bitumastic followed by a coat of gunite, and laid on bottom with blocks of concrete every 20 feet to weight it down.

The pump station is located close to the lake on a southeast corner of the Shell property at Palmarejo de Mara. There will be three pumping units, each with a dual-fuel (gas and oil) motor of 1,850 hp. Pumping operations will be conducted at an initial pressure of 575 psi. Communications will be carried on by radio stations located in Palmarejo, Dabajuro and Cardon, supplemented by teletype.

The contractors carrying out the various phases of this project include Gahagan Overseas Construction Co., dredging and filling of the trenches for the Lake Maracaibo crossing; Mahoney Contracting Co. of Venezuela, laying of pipe for the two underwater crossings; Williams Brothers of Venezuela, laying of land stretches; Macco Panpacific, Inc., construction of the Palmarejo pump station; Foster Construction Co., construction of a part of the elevated bed over the Las Salinas salt flats; Maracaibo Towing Co., construction of the remainder of the elevated bed and handling and transport of all imported pipe from boat to beach on the northwest coast of Venezuela.



Six-Year Plan for Oil

The Polish Six-Year Plan calls for mobilization of all its resources to increase the extraction of crude oil.

In a periodic report on the oil business, a worker-correspondent of a newspaper described the condition of Group II of the Gorlice oil wells. Due to the achievements of "work competition" in which 70 percent of all women and 90 percent of all juveniles joined, making an overall percentage of 85 percent, the extraction of crude oil has increased to a record of 102.2 percent of natural gas to 110 percent, and the drilling plan to 104.2 percent. Twice as many meters in depth were drilled in June as in January.

Along with the increase in amount of work done, the workers also are engaged (by government order) in saving on production costs by using old pipe on new drilling. The Gorlice II field has 5,192 meters of drilling with old pipe to its credit.

Rationalization committees have been formed by groups of activist (Communist Party) workers, trying to "persuade" the oil field administration to use new methods, increase working hours, and utilize old equipment for new undertakings. Special attention is given by these political activists to the introduction of competitive methods, and due to the increased work requirement for all other workers, the activist groups are widely combatted and their suggestions meet with some resistance because of the lack of a sufficient quantity of consumer goods.

Petroleum Consumption in Egypt

Estimated consumption of petroleum products in Egypt during 1951 is shown by the following table together with quantity of each derived from domestic crude and that supplied by imports, the figures being in thousands of metric tons.

Product	From Egyptian Crude	Imports	Total
Fuel oil	1,118	212	1,330
Kerosine	176	444	620
Motor gasoline	164	81	245
Diesel oil	43	155	198
Gas oil	23	118	141
	1,524	1,010	2,534

Lubricating oils and bitumen are not included in the above compilation. Of other products, as the table indicates, about 60 percent is of domestic origin and 40 percent imported. Products in greatest demand are fuel oil and kerosine which account for roundly 80 percent of the entire consumption.

Recent civil disturbances have interfered to some extent with the movement of petroleum supplies and apparently have brought the government to a point where it is willing to liberalize some of the regulations in regard to company control and the export of products or profits. The appearance in Egypt in November of Glenn McCarthy, Texas oil operator, was accompanied by reports that an agreement had been signed for the exploitation of some 7,000 square miles of Egyptian lands regarded as potential oil bearing territory, but it was stated that this arrangement was contingent upon action by the parliament authorizing control of the National Petroleum Co. to pass to foreign interests.

Zistersdorf Production

The 1951 production of crude oil in the Soviet-operated Zistersdorf oil fields has exceeded 2.2 million tons, topping previous records. The monthly average is at present 180,000 tons, exceeding the top 1.2 million tons Nazi output of 1944. Newest estimates reveal that Zistersdorf area will be largely depleted within the next eight years.

New drilling equipment has been installed in Adlerklaa and Bockfliess I and II fields, resulting in a total of 10 new producing wells in the Bockfliess area. The additional equipment was shipped there from Eastern Germany, having come originally from Romania, where it was taken from the Ploesti fields.

Gulf Sells Canadian Gas

Canadian Gulf Oil Co. has signed a 25-year contract to sell large quantities of gas to Northwest Natural Gas Co. for delivery in the Pacific Northwest. Details of the contract were revealed on Nov. 13 when the Alberta Conservation board resumed gas export hearings at Calgary court house.

Northwest Natural Gas Co. is an applicant to export natural gas and proposes to construct a line to the international border near Kingsgate, B. C., and thence west via Spokane, Wash., to a point north of Seattle. North and south branches from Seattle would serve Vancouver, B. C., and Portland, Ore.

Northwest has agreed to pay 10¾ cents per thousand cubic feet for the first three years, to be followed with an increased price of ¼ cent per thousand cubic feet each calendar year for the following 22 years for the export of 80 billion cubic feet a year. The gas is to be for the use of Vancouver and other British Columbia centers, and for the Pacific Northwest market of the United States.

The construction of a 24-inch pipe line, with capacity of 285 million cubic feet per day, is proposed by Northwest at a cost of $71,611,000. The agreement specifies that Northwest during the first full year will buy 90 percent of requirements from Gulf, 81 percent in the second year, and 70 percent in the third. From the third year on, Northwest agrees to take an average of 156 million cubic feet per day, varying from a basis of a minimum of 125 million cubic feet daily to a maximum of 176 million. The agreement also states that Northwest must pay for at least 85 percent of the required amounts whether or not they be taken.

With steel secured, together with all necessary permits, Gulf agrees to start drilling other wells, and to continue this as required. Also Gulf agrees to the construction of a gas treating plant.

B. Th. W. van Hasselt

Van Hasselt Resigns Royal Dutch Post

For reasons of health, B. Th. W. van Hasselt presented his resignation as general managing director of the Royal Dutch Petroleum Co., effective Dec. 31, and his retirement was accepted with regret by members of the board. At the same time he tendered his resignation as a managing director of the operating companies of the Royal Dutch-Shell Group to take effect simultaneously. L. Scheppers, who has been managing director of N. V. de Bataafsche Petroleum Maatschappij in charge of the coordination of production, has been selected for the post vacated by Mr. van Hasselt. Mr. van Hasselt will continue as a director of Royal Dutch Petroleum Co. while Mr. Scheppers becomes a managing director of that company.

Natural Gas as Motor Fuel

Two hundred automobiles are reported ready for operation with natural gas as fuel instead of gasoline in Poland. A new filling station is scheduled to be opened soon in Ochota, an industrial center in eastern Poland, able to service 150 natural-gas-driven cars daily. The majority of Polish cars reported are to be converted to the use of this fuel during the coming year by the installation of pressure tanks.

In the first week of December two more filling and service stations dispensing natural gas for motor vehicles are to be opened in Warsaw. The completion of the pipe line from the natural gas field 40 miles south of Warsaw has made their operation feasible.

Due to the necessity of saving gasoline in today's Poland, natural gas is urged as a substitute, since it costs only half as much as gasoline. New companies have begun the production of natural gas cylinders. Some of the building combines and parts of the nationalized transport companies have already changed over their vehicles to the use of the new fuel.

Core Drilling In Pakistan

Pakistan Petroleum Ltd. is drilling a series of deep core holes in East and West Pakistan as a part of its extensive exploration program. Electric logs will be run to supplement core examinations. In Sylhet, the older and possibly oil bearing beds are deeply buried beneath much younger and more recent rocks, and it is therefore difficult to interpret the structure at depth. Ground reconnaissance, shipment of stores, and construction of a camp for this project was taken up early in 1951 when the company received an exploration license covering 4,950 square miles in Sylhet and Tippera.

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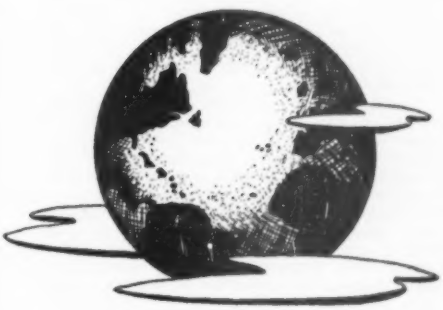

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Cliff W. Peery

New Mene Grande Division Manager

Mene Grande Oil Co. has announced that Cliff W. Peery has been appointed manager of its eastern division, with headquarters in San Tome, Venezuela. He succeeds Walter L. Keefe who has retired after 31 years with Gulf.

Mr. Peery, who will soon complete 18 years of service with the company, went to Eastern Venezuela as geologist for the Venezuelan Gulf Oil Co. in 1934. He is thus one of the pioneers in the development of Eastern Venezuela, where Mene Grande has built up 250,000 b/d of production since the late 1930's. He was transferred to the production department in 1937 as a petroleum engineer, and two years later was promoted to chief petroleum engineer. He became assistant superintendent of the production department in 1940.

The war interrupted Mr. Peery's work with Mene Grande in early 1943. He saw three years' service with the armed forces, including a year with the Marine Corps. Returning to Venezuela in 1947, he resumed his former job, and the following year became assistant general superintendent. He took over as general superintendent in 1949, and held the position until his present promotion to manager of the Eastern Division.

Alberta-Pacific Oil Line Approved

OTTAWA, CANADA

Action of the Dominion Board of Transport Commissioners December 14 in approving the Transmountain Pipeline Company for construction of an oil pipe line from Edmonton, Alberta, to Vancouver gives the go ahead signal to the year's most important development in the Canadian oil situation.

The line will be 693 miles in length and will follow an all-Canadian route through Yellowhead pass, terminating at Barnaby bordering Vancouver. It will have an initial capacity of 75,000 b/d, rising later to 200,000 barrels, and is estimated to cost $92,000,000.

The line will be built by Canadian Bechtel Ltd., which has assurances of a supply of crude from a group of producing companies representing both Canadian and United States interests. Building operations are expected to begin early this year. A number of contractors and pipe line builders will participate in constructing various sections of the line. Completion is expected late in 1953.

Increase Plant Output

Production at Mexico's new Antonio M. Amor refinery at Salamanca, in the state of Guanajuato, has been increased to 7,000 barrels a day, according to the Mexico City daily "Excelsior." The newspaper added current plans call for boosting the output to 10,000 per day by 1952, with an eventual daily production of 30,000 barrels.

Mexico Trades Oil for Pipe

Mexico has agreed to trade "four or five shiploads" of oil to Western Germany in exchange for steel pipe. Mexico needs pipe for a 93-mile pipe line to connect the new Colomo field with a refinery near Minatitlan and to supply casing for 300 wells to be drilled in 1952. France has been shipping large amounts of pipe but a Pemex spokesman said even more is needed.

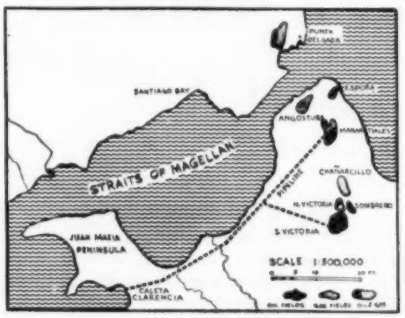
Another small but good field has been reported opened up near the Colomo field. It was tapped by the American Independent Oil Co., in which Petrofina, an important Belgian oil concern, has a large interest. One source said the new field is producing about 2,000 barrels a day, most of it going to Pemex.

Chile's Oil Industry Makes Progress

Development of the Magellan gas and oil fields of Chile is being carried on by Empresa Nacional del Petroleo (ENAP), a state-created organization which holds the exclusive right to conduct petroleum operations. A recent report of the company showed that up to the end of 1950 a total of 50 wells had been drilled and that the Chilean government had invested some 28 million dollars in the enterprise.

In addition to the original field of Cerro Manantiales (Spring Hill), production has been found at a number of points as a result of gravi-metric and seismic surveys conducted by ENAP itself and by United Geophysical Co. Seven producing wells have been drilled in Victoria Sur, three in Victoria Norte and two in Sombrero, these three pools all lying south of Manantiales. At Espora and Angostura, to the north, and at Chanarcillo, north of Cerro, gas fields have been found. On the mainland north of Magellan Straits both oil and gas have been encountered at Punta Delgada. Wildcat drilling has been under way further southwest on the continent and south of Bahia Inutil in Tierra del Fuego in the Miraflores district.

The pipe line from Cerro Manantiales to the shipping port in Caleta Clarencia, a little more than 40 miles in length, was completed last year. Storage tanks with a combined capacity of 340,000 barrels have been erected.



Under contract with Hudson Engineering Co. of Houston, a gasoline plant is being constructed at Cerro Manantiales. It is designed for treating 800,000 cubic meters of gas daily for the separation of gasoline, propane and butane.

Engineering has been initiated on Chile's first refinery by the M. W. Kellogg Co. The proposed new $10-million plant will be located at a site about ten miles north of Valparaiso. Kellogg was awarded the contract by Empresa Nacional Del Petroleo last month. Construction will begin under the direction of Kellogg Pan American Corp. in about a year.

The refinery, a complete 20,000-barrel-per-day plant, will include combination thermal processing equipment. Process facilities in the combination unit comprise crude oil distribution, vis-breaking, thermal reforming, thermal cracking, gasoline stabilization and treating equipment for sulfur removal from fuel gas, liquefied petroleum gases and gasoline. Kellogg will also design and engineer the power plant and all principal offsite facilities for the refinery.

International Petroleum's Totumal No. 1.

Colombian Wildcat Successful

International Petroleum Co. of Colombia has completed successfully its Totumal No. 1, a wildcat in the middle Magdalena valley. The well showed a potential of 1,100 b/d on a preliminary test. Oil is 25 gravity from a Cretaceous fractured shale formation. Totumal No. 1 was spudded on July 2 and drilled to 7,217 feet. Section tested was from bottom to 6,740.

The new discovery is particularly gratifying since Intercol interests have drilled some 21 dry holes over a period of 15 years in search of oil in Colombia. The concession covers about 124,000 acres.

Location for the No. 2 well has been made 3,300 feet east of Totumal No. 1. It is planned to drill the second well to at least 7,600 feet in order to test the Cretaceous lime underlying the present producing section.

Geologists consider that the Cretaceous discovery is of importance since it ties in with the Cretaceous of the Maracaibo basin, the Barco near the Venezuela border, and the recent Texas Petroleum Co. discovery in the upper Magdalena valley.

The well is about 10 miles from the Andian pipe line from the De Mares concession to the Caribbean. This does not provide a complete outlet solution, however, since the Andian line is now said to be fully loaded. Capacity increase may be undertaken if more satisfactory tariff can be established.

New Lake Tanker Launched

"Imperial Woodbend," the third in a fleet of the largest freshwater tankers in the world, was launched at Collingwood, Ont., on Dec. 6 for Imperial Oil Ltd. The three ships make it possible for the company to maintain an average daily flow of about 85,000 barrels of crude oil from the lakehead to the lower lake ports during the open season of navigation.

The new tanker was built for Imperial Oil by Collingwood Shipyards Ltd., at an approximate cost of $4,500,000. The ship has an overall length of 630 feet; breadth of 68 feet; capacity of 115,000 barrels on a 24-foot draught and a speed of 13 knots, which will enable her to complete a round trip between Sarnia and Superior in five days. She will carry about five million barrels of oil in a season.

Intercol Scholarship Fund

International Petroleum (Colombia) Ltd. has announced the organization of a board to administer a fund of 250,000 pesos for assisting selected young Colombians to obtain a technico-manual education in foreign or Colombian industrial schools. Members of the board are the Archbishop Primate of Colombia, the manager of the National Bank of Colombia, and the National Minister of Education in Bogota, who will serve as administrators of the fund.

Venezuela's Production Continues Rise

Crude oil production in Venezuela continues its steady rise to new high levels. Record output for the year thus far was 1,762,346 b/d produced in the week ending November 19, which represents a rise of 125,000 b/d since the beginning of 1951. Daily production in August was 1,709,014. In September it was 1,725,230 distributed by companies as follows:

	Eastern Venezuela	Western Venezuela	Total
Creole	134,819	597,392	732,211
Shell Co.'s	.....	538,071	538,071
Mene Grande	240,781	57,000	297,781
Socony-Vacuum	53,446	.....	53,446
Texas-Mercedes	32,959	12,393	45,352
Ven. Atlantic	17,574	.....	17,574
Sinclair	13,331	.....	13,331
Richmond	.....	10,256	10,256
Pantepec	9,870	.....	9,870
Phillips	6,395	.....	6,395
BCO, Ltd.	.....	943	943
	509,175*	1,216,055	1,725,230

* Includes 41,009 barrels from State of Guarico.

The rise in production has been paralleled by an increase in the number of rigs operating, which has grown by nearly 40 percent since the first of the year.

Nearly all companies have put additional rigs in operation, their reports showing 108 rigs in operation in November as compared with 71 in the preceding January. Of the November total, 21 rigs were on exploratory drilling, 87 on development, representing 20 and 80 percent respectively.

A new formula for calculating the national royalty on Venezuelan crudes has been accepted by the operators, according to a recent announcement of the Ministry of Mines and Hydrocarbons, but details have not been made public. The formula formerly in effect was suspended in October, 1949, as inequitable, at the request of the companies. For the past two years royalties have been paid on a provisional basis, using the minimums stipulated in the Law of Hydrocarbons for heavy oils and the provisions of the previous agreement for light oils. Acceptance of the new agreement puts an end to two years of intensive study by the Ministry, the companies, and outside experts called in by both sides to consider the problem.

For a million dollars, Socony-Vacuum has acquired extensive properties in the vicinity of Puerto Cabello. Reportedly, the company will spend another $30 million to build a pipe line terminal and refinery at this site. This means, apparently, that Socony is preparing to develop its acreage in the Barinas area, over two hundred miles southwest of Puerto Cabello, where the company has done extensive drilling but has kept the results confidential. Other companies hold acreage in Barinas and several known dry holes have been drilled there, but Socony has been the largest and most active concession-holder in that area.

Shell will add over $100 million to its capital investment in Venezuela during 1952. Some 30 percent of this amount will be spent for the improvement of living and working conditions in its camps. Other sums will go toward enlarging the capacity of the refinery at Cardon. Throughput, which was rated at 75,000 b/d in 1950, will be increased to 170,000 b/d in 1952.

Shell's Wildcat CQ-1, near the mountain of Valera in Western Venezuela, continued to test at under 13,000 feet as December began. Its LS-1387, deep test in the Pueblo Viejo field, was drilling near 9,500, while Canadones D MC-2, northeast from the Mara field, had passed 10,000 feet. C-149, Cretaceous test, about a mile northeast from the Concepcion field, was preparing, after nearly two months spent in fishing operations, to resume drilling at nearly 10,000 feet, and C-150, five miles northeast from Concepcion, was approaching 12,000 feet. Sibucara-7, near the city of Maracaibo, was testing at 13,900 feet, and Sibucara-8 was drilling at about 12,500. WT-13, in the West Tarra field near the Colombian border, was completed as an Eocene producer at about 5,000 feet. The other wells in this field are all Cretaceous producers. Richmond Exploration Co.'s Perico-1, on the Colombian side of the Goajira Peninsula, was drilling at 5,500 feet, while its Zulia 3G-1, southeast of the heavy-oil Boscan field, continued making hole at 10,000. Mene Grande Oil Co. had a wildcat, 1-MXZ-1, drilling at about 6,000 feet in a new area northeast of the Mara field, on acreage acquired from the now dissolved Orinoco company. Texas Co. abandoned the second of two wildcats on the shores of the Gulf of Venezuela, El Callao-1, at 9,155 feet.

In Guarico, in Central Venezuela, Venezuelan-Atlantic was exploring with the drill in the vicinity of Santa Maria de Ipire. Felix-1, eight miles northeast from the town, was abandoned at 5,502 feet at the end of November. The rig moved to Julio-1, two miles northeast from Santa Maria. Farther north, Atlantic continued to drill a series of slim holes in the Savan area, with some successful completions. Sinclair's Dakoa-1, west from Atlantic's Ruiz field, failed to get clean production and was abandoned at about 4,500 feet. The same company's Piedra Azul-1, seven miles north from the Tucupido field, was testing at just under 10,000 feet as December began.

In Eastern Venezuela, Creole plugged and abandoned East Maron-3 as a dry hole at 11,075 feet and suspended operations in the area. Quiriquire Q-533, a Creole deeper-pool test, blew out and ignited at 7,825 feet on October 11, and was out of control until October 25. Operations were resumed immediately, but no new hole had been made as December began. Farther east, Guanoco-2 was preparing to deepen after some testing at 6,787 feet. In the Greater Oficina area, Texas Co.'s Mata-5 was fishing at nearly 11,000 feet, and an access road for Mata-3 was building. Socony's North Chimire-1 was abandoned as dry. Cantaura-1 was at 10,000 feet and going deeper as December began. In the Santa Barbara area, Phillips resumed drilling in the Mata Grande field, after a lapse of two years, and Mene Grande Oil Co. spudded Barba-1, which was fishing at just below 4,000 feet as December began. In the Great Urica area of northern Anzoategui, Mene Grande had three wildcats operating: Divi-1, fishing at 7,600, La Vieja-1 (deepening), drilling at 10,500 and Quiamare QXG-3, drilling at 4,700 feet. In the Greater Oficina area, the same company was drilling Tapuco-1, jointly with Creole, at 10.000, and East Chipo-1 at 7,300 feet. In a new pool test GXG-501, south of the central Guara field, Mene Grande had an excellent dual-zone producer. CaZ-402, first development well in the new East Caico field, was also a very satisfactory dual-zone completion.

Among the scheduled wildcats, Shell planned a new field test in the Lake Maracaibo concession LAC-50, 12 miles offshore. The company also had a party at work preparing a location in the Rio de Oro area of southwest Zulia near the Colombian border, in hostile Indian territory, where Pebiy-1 was drilled many years ago. Still a third Shell wildcat was programmed for the mountain state of Tachira. Texas Co. was preparing to drill Catalan-1, in the Buchivacoa district of the state of Falcon. In Eastern Venezuela, Texas announced Rinco Largo-5, four miles east of the field of the same name, where it has not drilled for several years. Socony was to drill Anaco-2. East of the Maron lots, where Tonoro-1 was drilled and abandoned some years ago, Creole was planning to drill a wildcat on Atlantic acreage within 200 meters of a Phillips concession, each company taking a one-third share. In Guarico, Sinclair was moving in on Alacran-1, a new field test about ten miles due south of the town of Chaparro.

Oil Tanker Burns at Zistersdorf

Helmut Klein, an Austrian tank gauger and the chief of the local oil-field fire brigade at Zistersdorf, Austria, has been arrested as the result of an oil tank explosion and fire. The Soviet Mineral Oil Administration announced that a United States' agent had made the explosion possible. Klein is presently accused of being in the service of the "Wall Street Imperialists."

Recommends Bolivian Loan

Bolivia, the first South American country to expropriate American oil company property, now shows signs of wanting oil companies back in. Officials have drafted a proposed new set of petroleum regulations and the Director General of Mines and Petroleum sent them in November to the President General for possible approval by decree.

Definite word of the proposed regulation is contained in a report expressing enthusiasm about Bolivia's petroleum prospects which has been circulated among United States officials. The report was prepared by Don L. Carroll, a consultant of the Export-Import Bank. It recommends that the bank approve Bolivia's application for a $3 million loan, under certain conditions, to help her attain self-sufficiency in petroleum. A target of 5,000 to 6,000 barrels a day of refined products is indicated in the report.

Mr. Carroll, an oil geologist, is an official of the tax amortization staff of the Defense Production Administration. He took his leave from his DPA post to go on the research mission for the bank. Mr. Carroll reports that private companies would be granted concessions up to 300,000 hectares a person or company, and up to 800,000 hectares for groups of companies or persons. Foreign government controlled companies would be barred. The concessions would cover three periods. These are a three-year, non-renewable, exploration period; a two-year period for getting ready to drill; and a 55-year production period. The rental would rise for each period. A royalty of nine percent of the production, over and beyond rental payments, would go to the government. The rental rates are said to compare with U. S. charges for public lands.

The Carroll report says field observation indicates that nearly 100 structures exist between the Argentine border and the Piray river, all of which deserve exploratory drilling. In this area alone, says the report, the indications are that proved and probable reserves might come to at least two billion barrels; this does not include petroleum in the lowlands to the eastward, which, says the report, show geological indications of oil beneath Chaco sediments.

Offshore Award in Persian Gulf

An arbitration award, announced in London, has settled the controversy over control of mineral rights in a portion of the Persian Gulf lying off the small principality of Abu Dhabi on the Trucial Coast of the Arabian peninsula. Concessionary rights over the Sheikdom have been held since 1939 by Petroleum Development (Trucial Coast) Ltd., a company associated with Iraq Petroleum Co. Ltd. The ruler of the tiny state, Shaikh Sakhbut bin Sultan bin Zaid, made a subsequent agreement with a subsidiary of Superior Oil Company granting it exploratory rights over offshore waters. This action was contested by Petroleum Development on the claim that its concession covered both land and water areas.

By mutual agreement, a British Peer, Lord Asquith of Bishopstine, was appointed as umpire to settle the dispute. His decision, announced late in November, held that the concession of Petroleum Development applied to the territorial waters of the state as part of its land area but did not extend to the subsoil of outlying waters which should properly be considered part of the continental shelf. Thus the right of the state to make a separate agreement for that area was confirmed.

Corrosion Elimination Booklet

G. & J. Weir Ltd. has published a booklet "Eliminate Corrosion in the Power Plant" which explains the corrosive action of dissolved oxygen in otherwise pure boiler feed water and describes the means of eliminating it in land and marine power plants through use of the Weir Optimum De-Aerator. The booklet is a companion to an earlier booklet on corrosion and scaling due to impure feed water, and is available upon application to the publicity department, G. & J. Weir Ltd., Cathcart, Glasgow, S. 4.

Austrian Refinery for North Africa

An Austrian construction company has received an order to erect a refinery of 300,000 metric tons annual capacity near the town of Algiers in the French North African province of the same name. The refinery, which is to be enlarged later to one million tons capacity, will process crude oil extracted in fields near Algiers.

The Austrian firm was able to stipulate in the terms of the contract that Austrian raw materials may be used in the construction, thus making a big sale of material for much-needed foreign currency. Among the items bought in Austria are parts of a modern refinery planned during World War II but never erected. Austrian specialists will supervise the construction of the refinery, and will place some permanent technical staff members in the Algiers post.

New Intercol Treasurer

Sr. Carlos A. Rodriguez has been appointed treasurer of International Petroleum of Colombia, to succeed Sr. F. J. Espinosa who has become manager of Esso Colombiana, S.A. Sr. Rodriguez joined Tropical Oil Co. in Oct. 1947. In 1950 he was named head of the treasury department of Esso Colombiana when that company was organized. He was born in 1914 at Bogota, graduated as an economist from Lawrence College, Wis., and took a degree from the business school of the University of Michigan.

Joins Refinery Engineering

Harold F. Koons has joined Refinery Engineering Co., Tulsa, as project engineer. Mr. Koons was with Jones & Laughlin Supply Co. for more than seven years as a process and mechanical engineer. More recently he has been a refinery engineer with Derby Oil Co. at Wichita, Kansas.

G. C. Shivers, Jr.

New Seismograph Firm

G. C. Shivers, Jr., president of Southwestern Consultants, Inc., has formed a contract seismograph firm with home offices in the McBirney Building, Tulsa. The new firm is now operating five seismograph field parties in the Mid-Continent and Rocky Mountain areas. Mr. Shivers put out his first crew in mid-year 1950. He has had extensive geophysical experience in Louisiana, Mississippi, Georgia, Tennessee, Kentucky, Ohio, New York, Wyoming and Colorado. Mr. Shivers joined Southern Geophysical Company early in 1949 and advanced to the rank of supervisor before leaving to form Southwestern Consultants, Inc.

Texas Natural To Increase Output

Texas Natural Gasoline Corp. is celebrating its third anniversary of operations as a manufacturer and marketer of natural gasoline and its by-products. The company was organized in 1948 with a staff of only four employees and now has a personnel of approximately 200. It operates four natural gasoline plants and owns an interest in a fifth. Production is being increased from 83 million gallons to 162 million gallons per year. The corporation's principal offices are located in the Wright Building, Tulsa, and its officers are: John T. Oxley, president; John D. Curtin, Jake L. Hamon and Edwin L. Cox, vice presidents; Claig H. Perry, secretary; and Leon McVay, general superintendent.

900-Ton Portable Oil Heater

The oil heater division of The Lummus Co. has just published a 16-page brochure entitled "Lummus Beats The Clock For Magnolia." Locale is the Beaumont, Texas refinery, where Lummus applied its portable heater technique to replace a wornout visbreaker furnace with a 900-ton modern heater at a cost in down-time of only six weeks. Twenty-two photographs show various steps including the skidding operation which moved the heater 100 feet in less than ten minutes. Free copies may be obtained by addressing The Lummus Co., 385 Madison Ave., N. Y. 17.

New Alloy Welding Pipe Fittings

Key Co., of East St. Louis, Ill., has developed a complete new line of alloy steel welding pipe fittings and flanges. The new design provides greater wall thickness throughout and added thickness at areas of stress to make the fittings the strongest part of piping.

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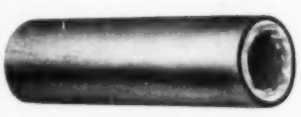

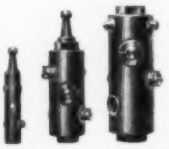

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Alkylation Plant Reactivated

Rehabilitation of a dormant alkylation plant at the Sunray Oil Corp. refinery at Duncan, Okla., will begin immediately and the unit should be in production within approximately ten months. Sunray has received a Defense Production Administration certificate of necessity to cover alkylation equipment at the refinery and will invest about $1,750,000 for the work.

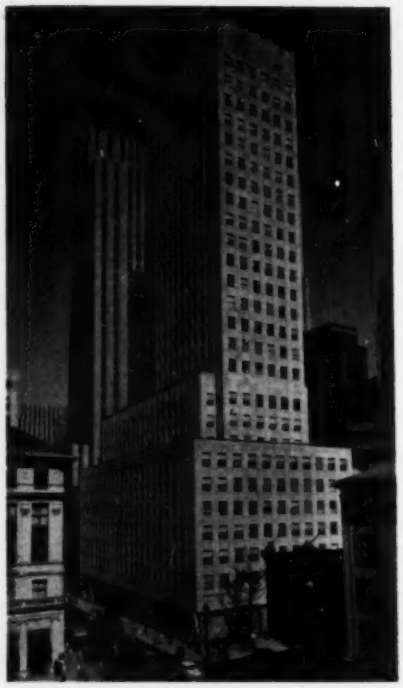
Scheduled new work at the refinery also includes increasing the capacity of the catalytic cracking unit. The improvements will increase production of propylene tetramer, currently in short supply as a modifier in the cold rubber process and as a base stock for the manufacture of industrial detergents. In the proposed improvement of catalytic cracking facilities, which will be done by the Refinery Engineering Co. of Tulsa, the catalytic blower will be remodeled to supply a larger quantity of air for regeneration of the cracking catalyst and regeneration capacity will be increased about 40 percent.

Organize Exploration Firm

Thomas P. Pike, president of Thomas P. Pike Drilling Co., Los Angeles, and associates have formed a petroleum exploration organization known as the Christopher Oil Co. Drilling operations in West Texas are to be conducted. The managing partners are Mr. Pike, Stanwood I. Williams and H. G. Haney. Offices are being maintained in Los Angeles and in Midland, Texas.

Shell To Enlarge Norco Refinery

A $30 million building program at the Shell Oil Co. refinery at Norco, La., will increase the plant's daily capacity by approximately 50 percent, from 50,000 to 75,000 barrels daily. The project is part of a $100 million program. Crude oil distillation and alkylation will be greatly expanded and a catalytic cracking unit installed.



Finishing touches recently have been put on the new Sinclair Oil building at 600 Fifth Ave., New York City. General offices of Sinclair Oil Corp. and Sinclair Refining Co. occupy nine floors of the new building which follows the general style of the adjacent Rockefeller Center group of buildings.

To Expand Houston Plant

Sinclair Refining Co. will increase the capacity of its Houston refinery from 85,000 barrels to 110,000 barrels daily at a cost of $28 million. Upon completion of the program in the fall of 1953, the plant will be the largest of the seven Sinclair refineries. All of the engineering work on the new project has been completed and construction contracts have been let.

The entire program is built around a new 40,000-barrel fluid catalytic cracking unit. To provide charge stock a 35,000-barrel crude unit will be built. A primary vacuum tower will supply lubricating oil cuts and a secondary vacuum tower will provide the heavy gas oil charge for the fluid cracking unit. Desalting units are also being constructed. A new steam generating plant providing for additional steam production of 250,000 pounds an hour is being installed.

Worthington Has New Type Pump

A heavy duty, vane type rotary pump has been added to the existing line of rotary pumps manufactured by Worthington Pump and Machinery Corp., according to an announcement by A. H. Borchardt, vice president in charge of sales of reciprocating pumps. All models are positive displacement, sliding vane type in which the pressure of the liquid being pumped maintains contact of the vanes against the liner. They are to be manufactured in both internal and external bearing design, the external bearing models being especially suited for non-lubricating liquids such as gasoline and kerosine. They can be made in either standard fitted, bronze fitted or all bronze construction.

Romania Completes Plan

Speed-up work brought about the fulfillment of the 1951 plan for oil production in the Ploesti fields by Oct. 9, 1951. Beginning with Oct. 10 production, the workers started on the 1952 plan.

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Silmo	Sicromo 3	Sicromo 9M	35-15*
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New headquarters and research laboratories of United Geophysical Co., Pasadena, Calif.

United Geophysical Builds New Plant

United Geophysical Co. has built a new $750,000 plant at Pasadena, Calif., with separate buildings for each of the company's five divisions: research and development, engineering and supply, operations, interpretation and computation, and finance.

Special research facilities include new and unique measuring instruments, a model test hole, electrically shielded rooms, a high-pressure test chamber, and research trucks. The construction department makes the electronic equipment, cameras, seismometers, galvanometers and all recording instruments. Custom-built seismometers are constructed in a shop devoted entirely to this purpose. A complete machine shop is set up for making instruments, and an installation shop is maintained to outfit trucks with custom bodies and specialized geophysical equipment.

Well Spacing Study

Two years ago the Research and Coordinating Committee of the Oil Compact Commission decided to undertake a study of oil well spacing and the controlling factors, and found that it lacked information on the thinking of the industry. Therefore a number of experienced engineers and geologists from the petroleum industry were invited to appear before the committee and give their views on the subject. The papers submitted by these gentlemen were turned over to a sub-committee for analysis and comparison with the views of other authorities. The booklet in hand reproduces papers by H. H. Kaveler (Phillips Petroleum Co.), C. W. Tomlinson (independent operator) and John C. Bartram (Stanolind Oil & Gas Co.).

From its study of the facts presented, the committee derived an opinion that, disregarding the element of time, there is not necessarily a relationship between well density and ultimate recovery from a reservoir. Rather, the ultimate recovery of oil is dependent on the application of good conservation practices. There is a category of cases where close spacing is appropriate and a category where wider spacing patterns are warranted.

Close spacing is suggested when an irregular or very narrow structure is being developed, where a high percentage of dry holes shows no definite trend of the field or when it is desirable to shorten the producing life of the reservoir to gain time by sacrificing recovery per well. In fields with strong water drives the drilling of additional wells will avoid coning of water and danger of channeling and trapping of oil, though the closer spacing in this may not increase ultimate oil recovery. In slow permeability horizons with dissolved gas-drive and a sufficient pay thickness, close spacing may increase ultimate recovery in many instances, but in borderline cases will hardly warrant the expense of additional wells. In fields with gas-cap or gas injection projects, a higher concentration of the wells outside the gas-cap areas may conduce to greater operational efficiency.

On the other hand, wider spacing patterns are admissible when reservoirs have much structural relief, high porosity and permeability that allow high individual well allowables; where reservoir studies indicate limited waterdrives and low optimum reservoir withdrawal rate (in order to obtain satisfactory individual allowables); when thin pay horizons indicate low ultimate recoveries and where close drilling is not economically justifiable; where the cost of deep drilling and operation cost of deep wells are high, wide spacing is necessary to insure a reasonable return on the investment per well; when recovery operations include expensive fluid injection programs and it is necessary to hold down drilling and operating costs so as to make a profit; and when reservoir studies show that low total reservoir withdrawals are desirable to maintain reservoir pressure.

Throughout the discussion it is emphasized that well density is a minor factor in controlling ultimate oil recovery from a reservoir, and that economic factors, including time and market conditions, are of great importance in determining well density; in other words, close spacing should not be made a fetish.

Though it is a small book, it contains many suggestions that will be of much interest to oil field engineers.

Well Spacing. Published and distributed by the Interstate Oil Compact Commission, Oklahoma City 5, Oklahoma, 80 pages (1951).

Sohio To Enlarge Refineries

A $14 million expansion program at the Toledo and Lima refineries will be undertaken by The Standard Oil Co. (Ohio). Work will be started early this year on a $3 million surfuric acid alkylation unit at Toledo. Avgas capacity of the plant will be doubled when the new unit is completed in about 15 months.

Engineering and design work will be started at once for an $8,500,000 catalytic reforming unit and the $2,400,000 expansion of the crude coking unit erected in 1950 at Lima. The crude coking unit will be able to make both jet fuel and kerosine.

The catalytic reforming unit at Lima will be the first of its kind and will employ the new Sohio catalyst developed under the direction of Dr. E. C. Hughes at Sohio's research and development center in Cleveland. The expansion at Lima follows close on the $30 million program completed in 1950 which included a catalytic cracker, a lubricating oil plant and a crude coking unit.

International Cementers Changes Name

International Cementers, Inc. has changed its name to BJ Service, Inc. following a merger with Byron Jackson Co., of which it becomes a division. Operations are to be expanded.

Book Review

Oil and Gas Federal Income Taxation, by Kenneth G. Miller; published 1951 by Commerce Clearing House, New York 18, N. Y.; 284 pages, $7.50.

This is a presentation of the federal income tax system as it now affects the oil and gas industry; the need for this second edition arises from the fact that this system is not what it used to be. The author has retained what has not changed and has made additions necessary to bring the information up to date. Among important changes in that associations working under operating agreements are now taxable as corporations. An important change relates to a processor's right to depletion allowance. Other bearings of the theory of depletion are discussed and minor changes are treated. As the author observes, the oil and gas industry, being highly specialized, has more unusual situations and more difficult accounting and technical tax problems than any other. The oil accountant who figures the tax his company owes Uncle Sam may find much help in this book.

Deep Rock To Build Lube Plant

Deep Rock Oil Corp. has awarded a contract to The M. W. Kellogg Co. for a lubricating oil plant to be built at its Cushing, Okla., refinery. The new unit is scheduled for completion in December next. It will utilize the propane deasphalting and the phenol solvent refining processes to produce high quality lubricating oils. Its capacity will be 930 barrels daily of finished oils, a substantial increase over the existing lube oil plant. Auxiliary facilities of the new unit will be constructed by The Refinery Engineering Co. of Tulsa. New construction recently completed includes a crude still, fluid catalytic cracking unit, office buildings, and a research laboratory. Only a few weeks ago, the company announced that construction would start soon on a new blending and packaging plant for motor oils. The Chemical Plants Division of Blaw-Knox Construction Co. has the contract for this refinery addition.

Celebrates Twentieth Anniversary

Seismograph Service Corp. of Tulsa recently celebrated its twentieth anniversary with a meeting of party chiefs, supervisors and employees of more than ten years service. Some 90 of the top men held a two day technical meeting at which papers were presented by foreign managers and geophysicists. Present at the meeting were J. E. Dorris, R. F. Aldridge and H. C. Bickel, managers of the Venezuelan, Mexican and Canadian divisions, respectively.

The celebration closed with a banquet and dance at which L. G. Cornish, manager of the Midland, Texas office was honored as the oldest company employee. He had been with the company 20 years and one day. Harold L. Richardson was honored as the "Party Chief of the Year."

Seismograph Service was started with one crew and a $4,000 investment in November, 1931. The company now operates in the United States, Venezuela, Canada, Mexico, Trinidad, Iraq, Nigeria, Papua and the Kuwait Neutral Zone. It now has 54 seismic, gravity and gamma ray units in the field. G. H. Westby is president.

Top technical employees of Seismograph Service Corp. at annual technical conference in Tulsa.

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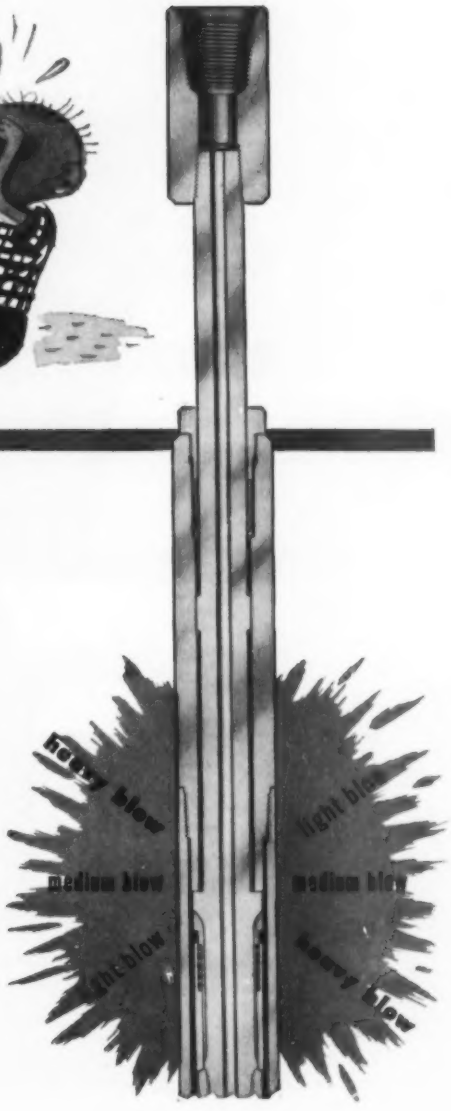

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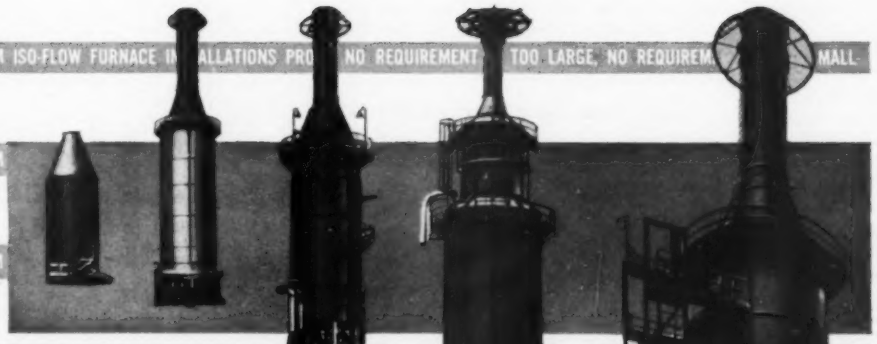

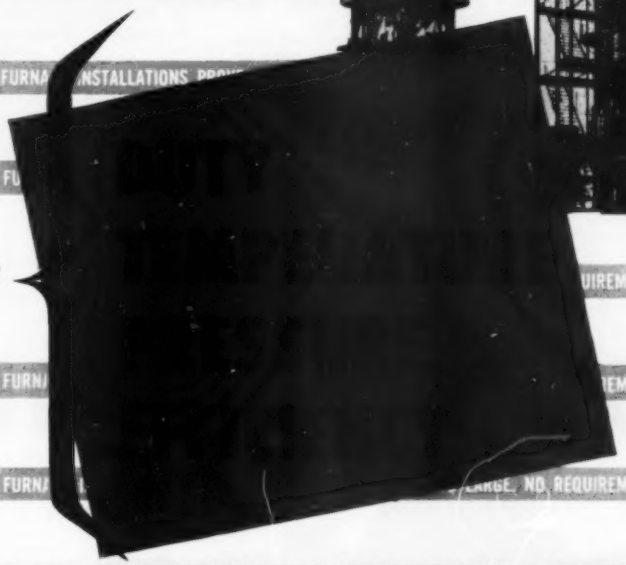

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Standard Vacuum

(Continued from page 35)

Bombay, Calcutta, Madras and Cochin; and grease manufacturing plants at Bombay and Calcutta. Stanvac operates 87 inland bulk storage plants and supplies some 800 retail outlets.

With a population of more than 350 million, India has nearly 20 percent of the world's population. Consumption of petroleum products in 1950 was only 3.1 gallons per capita per year, one of the lowest in the Far East.

In the post-war period there has been a substantial increase in consumption. In 1949 the demand for principal oil products averaged 88,500 b/d, an increase of 20.1 percent over 1948. In 1950 there was an additional increase of 7.9 percent to 95,500 b/d. It is not possible to make comparisons with pre-war operations because of the partition in 1947 of India from Pakistan. Details of consumption for 1949 and 1950 are shown in the accompanying tabulation.

The 1950 census lists 252,100 motor vehicles in India. Motor roads in the country are not well developed, total surfaced mileage is 87,183, and the total of all types of roads is only 332,000, or .27 mile per square mile of territory. The government has developed plans for the reconstruction of 14,000 miles of main roads into national arteries which will stimulate motor fuel demand.

Food is short in India so the government is planning to install large numbers of power pumps for irrigation and to put 11,000 tractors into service on farms.

At present about 22 percent of the petroleum consumed in India is kerosine. It is anticipated that this percentage will drop in the years to come as hydroelectric plants provide lights to replace kerosine lamps, as manufacturing operations increase requiring larger quantities of diesel and residual fuels, and as the building of roads stimulates motor transport by truck and bus.

Adds Three New Service Centers

J. E. Young

Schlumberger Well Surveying Corp. has added three new locations to its list of service centers. Moving into Williston Basin, which is potentially one of the major areas to be opened in recent years, the company has set up an office in Williston, North Dakota, under the management of J. E. Young, a member of the Schlumberger organization since January 1948. Mr. Young has worked in Montana and Wyoming districts.

A new location at McCamey, Texas, has been opened to place equipment near the point of operations. This station is in the charge of D. M. Quillan, who has been serving in the Permian Basin area for nearly three years.

In the Rocky Mountain area a new station has been established at Vernal, Utah, to handle the new discoveries and increased exploration in that region. John Rusen was transferred from Casper, Wyoming, to take charge of this station. Mr. Rusen has served in the Rocky Mountain area since his employment in Feb. 1948.

Orders New Tanker

A new 16,665-ton tankship will be added to the Pacific Coast fleet of Standard Oil Co. of California. Cost of the ship is estimated at $5,250,000. Similar in hull form to the famed wartime "T-2" type, the new vessel is to be built at the Chester, Pa., yards of Sun Shipbuilding and Dry Dock Co. The keel is to be laid in June, 1952, with delivery scheduled for midsummer of 1953. As yet unnamed, the ship will have a cargo capacity of 140,150 barrels. Compartmentation will permit carrying a great variety of oil products. Driven by geared turbines, the ship is to have a speed of about 15½ knots. Overall length will be 523 feet, six inches; beam 68 feet; and draft 30 feet, 11 inches.

Continental To Install Platformer

A UOP Platforming unit is to be built at Continental Oil Company's Lake Charles, Louisiana refinery. The unit will have a daily charge capacity of 5,000 barrels for aromatics production or 6,000 barrels daily for production of motor fuel. Continental will process a charge stock of approximately 150-200° boiling range Coastal straight run gasoline in its benzene and toluene manufacture, and a 250-400° cut for motor fuel production. Design will be by Universal Oil Products Co., Chicago, and construction will be handled by Procon, Inc.

Edits Alco Products Review

Daniel J. Duffin has joined the public relations department of American Locomotive Co. to edit the company's new house magazine "Alco Products Review." Mr. Duffin formerly acted as public relations director at Foster Wheeler Corp. He also has served as an editor and writer of technical books.

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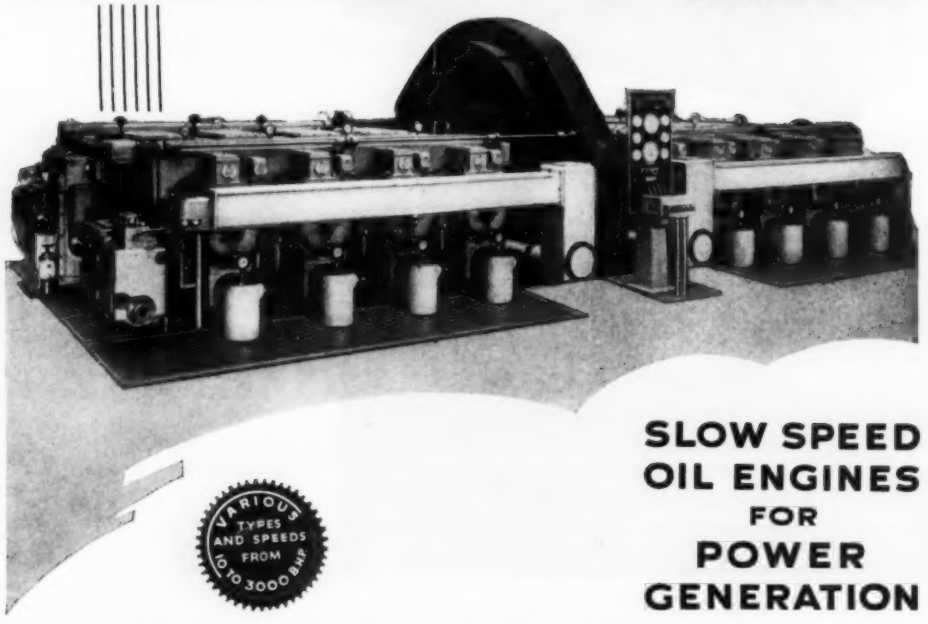

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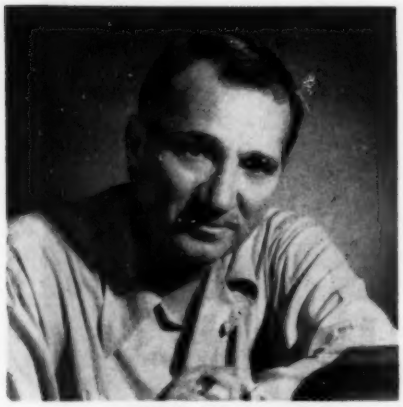

Wallace Davis

Corduroy Road

Wallace Davis, who is himself an inviting target for some ambitious biographer, has undertaken a task of more than ordinary difficulty. Disregarding the precept that no adequate story of a man's life can be written until at least a century after the subject's demise, Mr. Davis has boldly attempted to tell the story of Glenn McCarthy's career. As is well known, Mr. McCarthy is still very much alive and possibly some of the most interesting chapters in his life story are still to be written.

Fortunately Mr. Davis has not attempted a conventional presentation of his central character's progress from boyhood to comparative maturity, the word comparative being used for lack of one more closely descriptive. Instead he has put together a collection of episodes, each of which forms a link in the McCarthy career or illustrates some facet of his many sided character. Nor is the McCarthy rise in the world pictured as a steady ascent from obscurity to fame; there were many detours and some disastrous setbacks. In fact, the title of the book, "Corduroy Road," no doubt was suggested by the many rough spots in the McCarthy odyssey.

On the factual side, the book appears to have been prepared with every attempt at conscientious accuracy. The author mentions in his preface that 400 interviews went into its making, "interviews with every one except Glenn McCarthy himself."

"Corduroy Road" is obviously honest in its purpose. It does not portray its subject as possessor of a particularly noble character or exceptionally high motives. It draws a portrait of a rough, tough Texan, animated by an unswerving ambition to win outstanding success as he himself measured it, undaunted by failure, unafraid of hard work, ready to exchange blow for blow and willing to take long and desperate risks. It shows a man of ungoverned impulses, who can drive a close bargain but who is ready to abide by its consequences if they turn against him, one who is capable of extravagant generosity toward causes that appeal to him. The impression it leaves is the one that one suspects Glenn McCarthy would apply to himself, namely, that here is a man who never pretends to be anything but what he really is.

Corduroy Road, the Story of Glenn McCarthy, by Wallace Davis, 296 pages; The Anson Jones Press, Houston, Texas. $5.00.

Chemical Consultants

Harold E. Bode and Charles D. Lowry, Jr., Chicago, have organized the firm of Bode-Lowry & Associates to act as consultants in market research and sales development in the chemical field. Mr. Bode previously was with Corn Products Refining Co. Until recently Dr. Lowry sold antioxidants for the Universal Oil Products Co., which he served for 23 years.

Sinclair Buys River Tow

Sinclair Refining Co. has purchased the 3,000-hp twin screw diesel towboat, "Mattie P. Simpson" and 11 river barges. The Simpson, which was completely overhauled at New Orleans, was rechristened the "Sinclair St. Louis" when she entered the Sinclair service Jan. 1.

The "Sinclair St. Louis" requires only 7 feet 6 inch draft and hence can travel anywhere in navigable inland waters. She can handle tows upstream of 120,000 barrels of products. She is equipped with ship-to-shore telephone and radar. The purchase marks Sinclair's initial venture in the towing business on inland waterways. The company has plans for materially increasing its river fleet. In the past all shipments have been made by charter.

Metal Restoration

A new electroplating method for the restoration of lost metal in expensive engine parts has been developed by Van Der Horst Corp. of America, Olean, N. Y. The process involves a new plating bath for deposition of electrolytic iron. The plating is reported to have a close packed, columnar grain perpendicular to the surface with which it is bonded, thus giving superior wear resistance. Deposits up to a quarter inch in thickness can be made.

"Varec" Equipment Now Manufactured In France

Vapor Recovery System Co. has completed an arrangement with Compagnie Technique des Petroles, Paris, under which Varec equipment will be manufactured in France. The new affiliate has been engaged in construction and operation of oil refineries and chemical plants throughout Europe.

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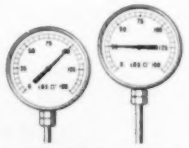

Steam pressure inflation

A NEEDLESSLY HIGH working steam pressure inflates the cost of production. But there is perhaps some confusion as to the benefits to be gained from reducing process steam pressures. The benefits must depend upon the individual circumstances.

(i) If it is back-pressure steam from an engine the immediate gain is the extra power available. For example, whereas an increase of 10 psi (from 150 to 160 psi abs.) in the initial steam pressure might give a power gain of 5.3 per cent., a reduction of 10 psi (from 40 to 30 psi abs.) in the back pressure can give a power gain of 18.6 per cent.

(ii) If the process steam comes directly from the boiler a reduction of the pressure can give a saving of fuel, make available a larger proportion of Latent Heat and ease the demands on the boiler.

(iii) If the process steam comes through a reducing valve, a reduction of the downstream pressure again makes available a larger proportion of that heat in the steam which is most readily usable in the process, and reduces the quantity of Sensible Heat to be exhausted from the plant.

(iv) If the steam is used for direct injection into process vats a reduction of the pressure reduces the risk of fuel wastage due to steam bubbles escaping uncondensed.

Many process steam pressures are unnecessarily high because the efficiency of heat transfer is lower than it ought to be. An improvement in the rate and uniformity of heat transfer from the steam at the process condensing surfaces will give a higher rate of plant output for the same steam pressure, or will give the same output at a lower pressure. Sometimes, indeed, both a higher rate of output and a reduced pressure are possible.

At this point you may find it useful to have a copy of Bulletin 16, "Steam Economy." Please use the request slip.

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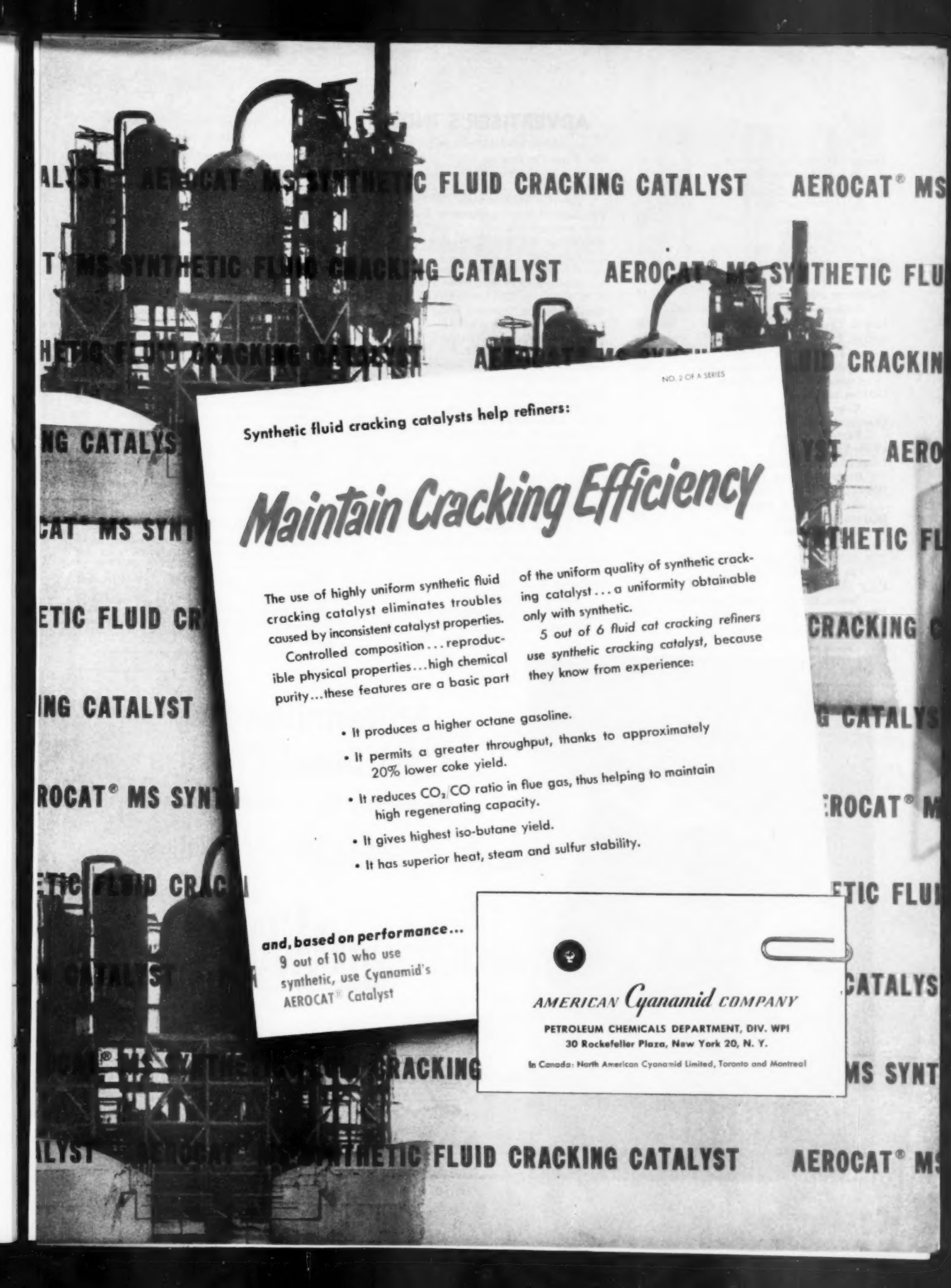

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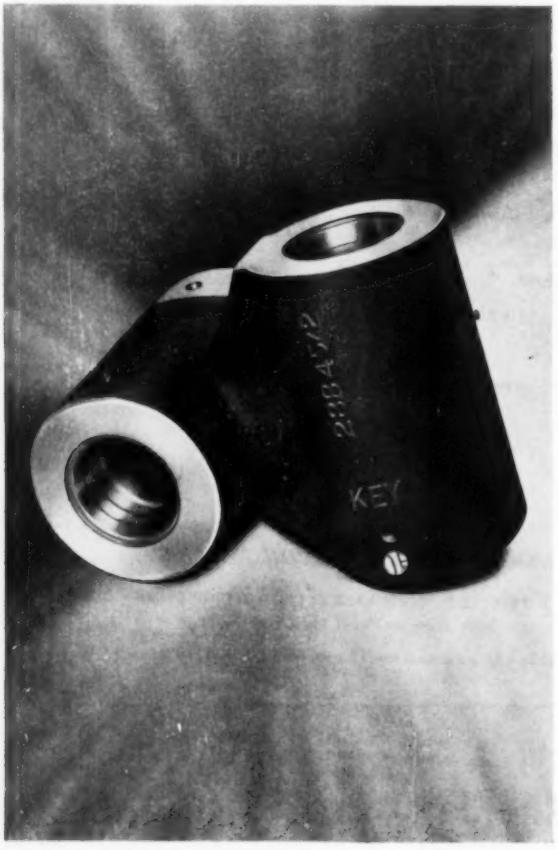

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Esso Dedicates Suburban Headquarters

The New York division of Esso Standard Oil Co. opened its news headquarters building at suburban Pelham, New York, on Oct. 19. Present at the dedication ceremonies were Supervisor Miller of the Town of Pelham, Mayor Boal of the Village of Pelham, Mayor Williams of Pelham Manor and Mayor Matthews of North Pelham and other officials of the community and of the oil company. The exercises were attended by the 300 employees in the headquarters building which serves the sales division of New York State.

Commenting on the theme of good citizenship by big business, Stanley C. Hope, president of Esso Standard, said: "All of us have heard bigness in business condemned as if bigness, per se, is evidence of badness. That sort of thinking is fostered by those who recognize that America's strength stems in part from its free enterprise-capitalist system and, because they don't want America to be strong, they attack that system.

"There is not much good in arguing with inspired detractors of this sort; we do better first to lead good corporate lives and then to make our way of living better known to others who have honest misunderstandings and misconceptions."

Some people honestly mistrust big business for four reasons, he said. These include fear that the growth of big business may hurt small business, fear of monopoly, fear that workers do not get their just reward and fear that big business fails to assume its responsibility as a good citizen.

"Far from hurting little business", he said, "big business realizes very well that it is dependent on small business. Esso Standard Oil Co. is only one of more than 50,000 independent partnerships and incorporated businesses having direct interest in the production, refining and distribution of Esso products."

The new headquarters brings together the sales and billing departments of the company which were formerly located in New York City, Boston, Mount Vernon, and other places. W. H. St. Clair, division manager said: "It was made necessary by increasing demand for petroleum products in New York state because of greatly increased automobile registration and use of heating oil in homes."

New Mass Spectrometer

Consolidated Engineering Corp., Pasadena, Calif., has developed a dual-purpose mass spectrometer designed for the analysis of mixtures of gases and light liquids, as well as for determination of ratios of stable isotopes. The new mass spectrometer operates without refrigerants and employs numerous automatic devices to minimize operator errors and effect a saving in the time required for analysis.

New Jar Safety Joint

Shaffer Tool Works, Brea, Calif., has developed a new type of fishing tool which combines the operating features of both a straight-pull jar and a releasable safety joint. Known as the Shaffer Jar Safety Joint, this new tool not only permits greater compactness and simplicity in the operating string, but also saves the cost of running two separate tools of conventional design. The tool embodies operating principles already field-proven in other Shaffer products, and has been successfully tested under a wide range of well conditions.

With the jar safety joint in the string, it is a simple matter to strike a powerful upward blow or series of blows to free packers or tools that may have become stuck. No torque or rotation of any kind is needed to strike the blow, therefore there is no interference with the operation of other tools in the string. However, if torque is desired to assist in freeing the stuck portion, such torque can be applied through the tool.

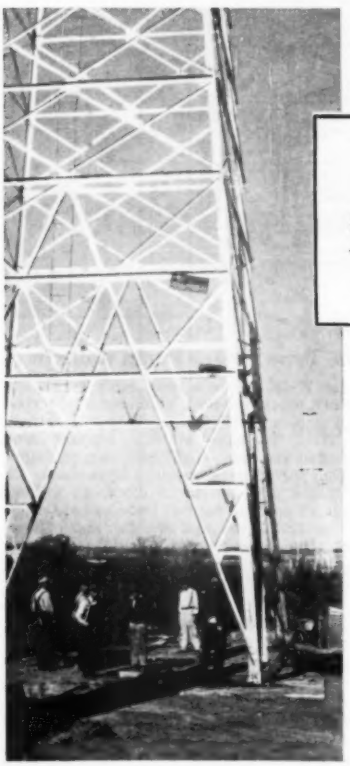
If repeated jarring will not loosen the string, the joint can be readily disconnected so that everything above the mandrel of the tool can be recovered. Subsequently, by simply using the recovered joint at the bottom of the run-in string, this string can be re-connected with the stuck portion for further recovery operations.

Cutaway view showing how drive keys remain in locking slot as blow is struck.

Safety Joint is released by rotating drive keys into the unlocking slot.

Cutaway view of new Shaffer Jar Safety Joint showing simple design and rugged, trouble-free construction.

The Shaffer Jar Safety Joint not only combines two tools in one but it also provides safety and simplicity. Only a single pack-off is required and only a few rugged parts operate as a coordinated unit in place of the many duplicated parts that cause multiple maintenance and operating problems where assemblies of single-purpose tools are used. The tool is available in a complete range of sizes to meet the requirements of all commonly-used hook-ups.



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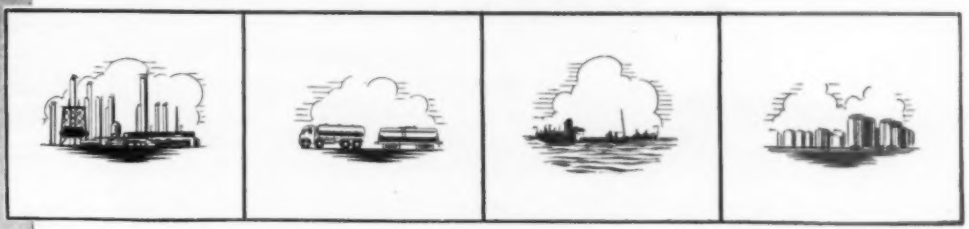

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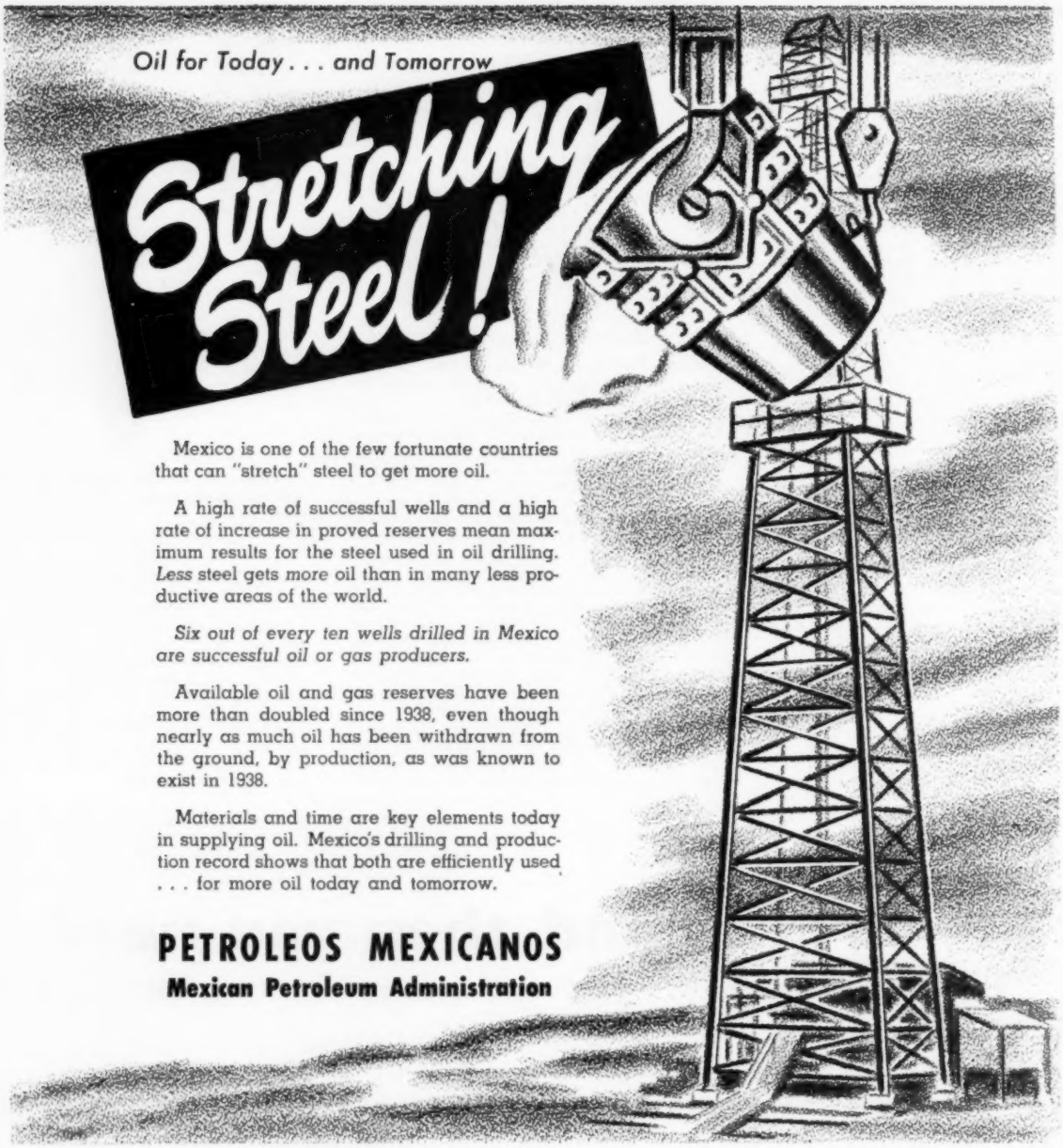
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PETROLEOS MEXICANOS
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Expansion Roof Tanks

Graver Tank and Manufacturing Co., East Chicago, Ind., has published a new booklet entitled "Expansion Roof Tanks." The booklet describes single and multiple unit installations and gives details of the oil seal and stabilizing mechanism which are features of Graver design. Standard and special fittings are illustrated. One section is devoted to charts and tabular data for the technologist. Economics of the expansion roof as compared with cone roof is given in detail. Copies are available on request to the company.

New Engineering Firm

Mechanical Design, Inc., has been organized with offices at Tulsa, Okla., to offer a mechanical engineering and design service to refineries and gasoline plants. Officers are: J. R. Lawrence, president; Herbert E. Dyer, vice president and manager; Maloy Stevenson, secretary; and Huff D. Peters, treasurer.

Interstate Compact Officers

Governor Sid McMath of Arkansas was elected chairman of the Interstate Oil Compact Commission at the commission's meeting in Little Rock, Ark., on December 12. Jeff Robinson, chairman of the Kansas Corporation Commission, was named vice chairman, G. E. Eddy, Michigan Conservation Director, was made second vice president and Earl Foster was reappointed executive secretary.

New Gardner-Denver Advertising Manager

Carson L. Ruyle has been appointed advertising manager of the Gardner-Denver Co., Quincy, Ill., to succeed Lt. Damon P. Tunnicliff, who has been called to active service in the Navy. Mr. Ruyle joined the Gardner-Denver Co. in 1930 and since has been a member of the sales division at the Quincy office.

Vane Type Rotary Pump Bulletin

Bulletin W-485-B1 on a new heavy duty vane type rotary pump has been published by Worthington Pump and Machinery Corp., Harrison, N. J. The four-page bulletin pictures and describes the six models of the pump in eight sizes. They include pipe openings from two to 12 suction inches and two to 10 discharge inches. The range of nominal ratings includes capacities from 25 to 1,000 gpm and speeds from 850 to 210 rpm. Dimensions, nominal ratings and line drawings of the pumps are also included. A request on company letterhead will bring a copy.

Opens San Francisco Office

Alan C. Tracy has been appointed manager of the new Pacific Coast sales office opened recently by the Charles Wheatley Co. in the Tilden Sales Building, San Francisco. He was formerly sales manager of Petroleum Equipment Co. in San Francisco and was also with the sales department of the Marshall-Newell Supply Co.

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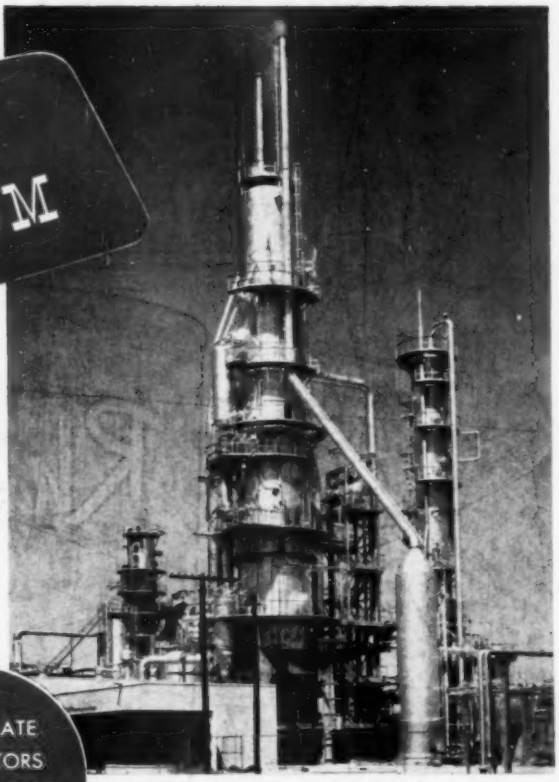

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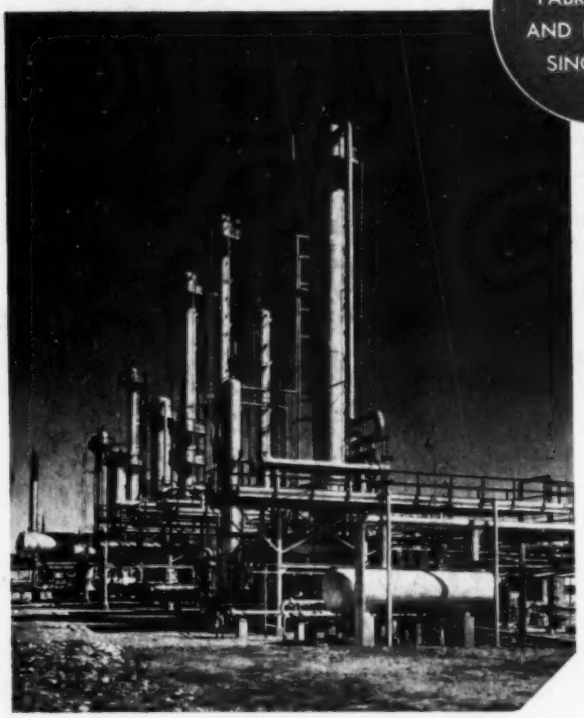

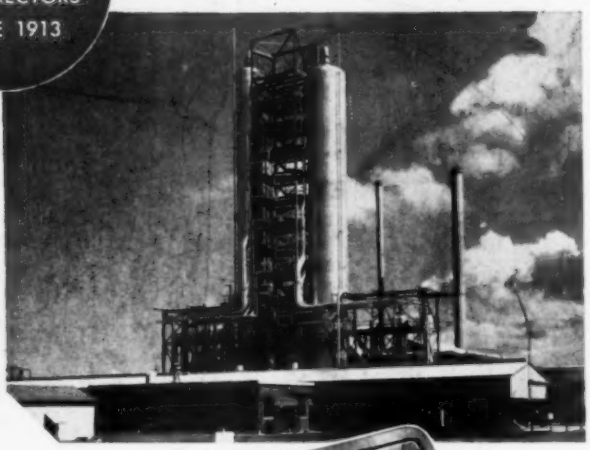

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